

NURSE CASE MANAGEMENT OF CLIENTS  
IN THE AIR FORCE WEIGHT MANAGEMENT PROGRAM

by

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## DEDICATION

I would like to dedicate this thesis to my wonderful family. To my husband, Adam, whose support and encouragement lifted me up like a buoy in the bay. Thanks for turning the lights out! To my daughters, Tai and Tenaya, who understood when I had to miss soccer games to finish up on my ..... I'll be there for the big plays! (Graduating from college). And.... Finally, to my Mom and Dad who gave me the foundation upon which I stand: To work hard, "never say never", and don't make "can't" a part of my vocabulary.

## TABLE OF CONTENTS

LIST OF FIGURES .....	8
LIST OF TABLES .....	9
ABSTRACT .....	10
CHAPTER I .....	11
INTRODUCTION .....	11
Background .....	11
United States Air Force Weight Management Program .....	11
Nurse Case Management .....	16
Goal Attainment .....	18
Statement of Problem .....	19
Statement of Purpose .....	20
Significance of the Study .....	20
Summary .....	21
CHAPTER II .....	23
CONCEPTUAL FRAMEWORK AND REVIEW OF THE LITERATURE .....	23
Conceptual Framework .....	23
King's Goal Attainment Model .....	23
Application of King's Goal Attainment Model .....	25
Review of the Literature .....	30
United States Air Force Weight Management Program .....	30
Nurse Case Management .....	31
Goal Attainment .....	33
Weight Loss .....	34
Alternative Hypotheses .....	41
Definition of Terms .....	41
Summary .....	42

## TABLE OF CONTENTS - Continued

CHAPTER III .....	43
METHOD .....	43
Design .....	43
Setting .....	44
Sample .....	45
Protection of Human Subjects .....	47
Data Collection Procedure .....	47
Nurse Case Management Intervention .....	48
Twelve Step Procedure .....	48
Nurse Case Management Activities .....	48
Instruments .....	54
Client Intervention Log .....	54
Scale .....	54
Tape Measure .....	55
Goal Attainment Checklist .....	56
Plan for Data Analysis .....	56
Summary .....	57
CHAPTER IV .....	59
RESULTS .....	59
Description of Sample .....	59
Sample Characteristics Related to Nurse Case Management Intervention .....	62
Results of Data Analysis for Alternative Hypotheses .....	63
Hypothesis 1 .....	63
Hypothesis 2 .....	64
Hypothesis 3 .....	64
Summary .....	65
CHAPTER V .....	66
DISCUSSION .....	66
Relationship of Results to Conceptual Framework .....	66
Relationship of Results to Literature Review .....	68
Nurse Case Management .....	68
Goal Attainment .....	69
Weight Loss .....	69

## TABLE OF CONTENTS - Continued

Explanation of Results .....	71
Implications for Nursing .....	73
Limitations of the Study .....	75
Recommendations for Future Research .....	75
Summary .....	76
APPENDIX A: UNITED STATES AIR FORCE INSTRUCTION 40-502 .....	77
APPENDIX B: BODY FAT STANDARDS .....	92
APPENDIX C: BODY FAT MEASUREMENTS FOR MEN .....	104
APPENDIX D: BODY FAT MASS FORMULA FOR MEN .....	106
APPENDIX E: BODY FAT MEASUREMENT FOR WOMEN .....	108
APPENDIX F: BODY FAT MASS FORMULA FOR WOMEN .....	111
APPENDIX G: MAXIMUM ALLOWABLE WEIGHT CHART .....	113
APPENDIX H: HUMAN SUBJECTS APPROVAL LETTER .....	115
APPENDIX I: DISCLAIMER .....	117
APPENDIX J: DAVIS-MONTHAN AIR FORCE BASE APPROVAL LETTER ..	119
APPENDIX K: INTERVIEW FORM .....	121
APPENDIX L: CLIENT INTERVENTION LOG .....	123
APPENDIX M: GOAL ATTAINMENT CHECKLIST .....	126
REFERENCES .....	127

## LIST OF FIGURES

## Figures

1 Conceptual Framework Depicting Nurse Case Management Role Intervention Using Goal Attainment Concepts .....	28
2 Conceptual Framework Depicting Nurse Case Management Intervention at the Construct, Concept, and Operational Levels .....	29
3 Description of the Total Amount of Time Spent in Each Component of the Nurse Case Management Process .....	53

## LIST OF TABLES

Table	Page
1. Results of Sample Selection from the Population That Met Criteria ( <u>N</u> =95) .....	60
2. Reasons for Non-Completion of Final Weight, Body Fat, and Goal Measurements ( <u>N</u> =38) .....	61

## ABSTRACT

Purposes were to describe nurse case management effect on a weight management program, compare weight and body fat changes in clients receiving usual services vs. enhanced services, and describe goal attainment. Using a quasi-experimental design, experimental group received case management and military weight program; the control group, military weight program.

Data analysis employed paired t-test, two sample t-test, and chi-square analysis. Paired t-tests indicated significant weight loss in experimental group ( $p = .01$ ), but not in control group ( $p = .16$ ). Two sample independent t-tests indicated no difference between group means ( $t = .57$ ,  $df = 24$ ,  $p = .58$ ). Paired t-tests indicated significant difference in fat loss in both groups ( $p = .01$ ,  $p = .00$ ). Two sample independent t-tests indicated no difference between group means ( $t = .71$ ,  $df = 24$ ,  $p = .49$ ). There was no relationship between the two groups on goal attainment  $\chi^2$  (1,  $N = 26$ ) = .02,  $p = .90$ .

## CHAPTER I

### INTRODUCTION

The purpose of this research was to describe the effect of nurse case management on weight reduction, body fat reduction, and client goal attainment in overweight clients who were Air Force personnel. Military clients who exceed maximum allowable weight (MAW) and maximum body fat mass (BFM) allowance are required to enroll in a mandatory program known as the Air Force Weight Management Program (WMP) (see Appendix A). WMP squadron managers monitor progress at least monthly, according to the guidelines in AFI 40-502 (see Appendix A). This program is an administrative program managed by unit personnel sections. Usually personnel sections do not address health needs of clients on a continuous basis and historically have not used nurse case managers.

#### Background

Background for this study includes literature on the United States Air Force Weight Management Program, nurse case management, and goal attainment.

#### United States Air Force Weight Management Program (AFI 40-502)

Background information for this study consists of a description of the United States Air Force Weight Management Program, Nurse Case Management, and Goal Attainment. The background provides a context for the Problem, Purpose, and Significance of the Study.

The Air Force WMP is a rehabilitative program designed to assist overfat individuals in meeting Air Force body fat standards. Program managers monitor individuals for 18 months after meeting body fat standards to reinforce long-term fitness and dietary changes (AFI 40-502, 1994). In many cases, individuals in the Air Force WMP experience failure at reducing weight to the standards set by military guidelines. Evaluation of Air Force personnel weight status occur at several points: (a) annual weigh-ins by the squadron (unit) to which individuals are assigned, (b) prior to rank promotion, (c) prior to individuals' moving to new geographical duty assignments, (d) prior to temporary geographical duty assignments, (e) prior to reenlistment, and (f) when a unit commander determines an individual appears to exceed body fat standards or does not present a professional military appearance (Air Force, 1994).

Air Force personnel enter the WMP when they exceed body fat standards. In other words, an individual is first weighed to determine body weight in pounds. If an individual is below the maximum weight standard in pounds, the squadron WMP monitor takes no further measurements. If an individual's weight exceeds the maximum number of pounds, the squadron WMP monitor measures the body fat mass (BFM). If the individual does not exceed maximum BFM, no entry into the WMP occurs. However, if the individual exceeds maximum BFM, placement in the WMP occurs. Therefore, individuals overweight but underfat are not entered into the WMP. Also individuals theoretically may be overfat but underweight and are also exempt from the program. This situation

occurs when the squadron WMP monitor does not measure BFM if individuals are under the maximum weight. Only individuals who are overweight *and* overfat enter the WMP.

Air Force body weight and body fat standards, based on age and height criteria, determine individual overweight and overfat status. These are the Air Force's maximum body fat standards:

20 percent for men 29 years old and younger

24 percent for men 30 years old and older

28 percent for women 29 years old and younger

32 percent for women 30 years and older (Air Force, 1994) (see Appendix B).

If identified as overfat, individuals enter *Phase I* of the WMP. Phase I is the initial entry and body fat loss period. Individuals in Phase I exceed BFM standards and are ineligible for reassignment to a new location, ineligible to reenlist, cannot assume a higher rank, cannot attend professional or continuing educational courses, cannot retrain into another career field, may enroll in a 90-day exercise program, and must receive diet counseling.

Individuals make satisfactory progress by losing 1% body fat each month or by losing 3 pounds (women) or 5 pounds (men) each month. Unsatisfactory progress occurs when individuals fail to comply with the above loss requirements. If unsatisfactory progress occurs, supervisors take punitive administrative actions and dismiss individuals from the Air Force for repeated failures.

Phase II of the WMP is the probation period after individuals achieve a status of being below maximum body fat standards. Individuals continue monthly weight measurements for 6 months. If individuals remain below maximum standards for 6 months, they enter into a one year observation phase. The monthly weigh-ins are no longer mandatory, but the squadron WMP monitor can measure individuals at random during the observation year.

If an individual in Phase II exceeds standards again, that person reenters Phase I and begins the program again. The weight monitoring process repeats and individuals receive punitive administrative actions accordingly. Also, if an individual exceeds standards at any time during the observation year, that person reenters Phase I and begins the program again. When individuals successfully complete the entire WMP (Phase I, Phase II, and the observation year), destruction of records occurs and negative information is removed from personnel files.

Except for monthly weight measurements, a medical evaluation and a nutritional consult comprise the only interaction between the health care system and personnel on the Air Force WMP. After the initial evaluation, individuals hold the sole responsibility for reducing their weight using methods of their choice. Sometimes clients choose drastic and unhealthy methods to lose weight. In other cases, clients do not have the educational tools necessary to promote weight loss. A one time medical evaluation and nutritional consult may not be sufficient to promote safe and effective weight loss.

For both sociocultural and psychological reasons, society places considerable emphasis on weight and appearance (Rodin, 1993). The Air Force also places emphasis on weight and appearance, but for reasons related to physical fitness and military image. Physical fitness, including weight management, is important to the Air Force because fitness affects military readiness, productivity, and health. Clients who are outside acceptable weight limits are at high risk for being discharged from service. They lose opportunities for continuing education and training, which also affects readiness, career promotion opportunities, new duty assignments, leadership, and work force numbers. WMP client supervisors complain of poor job performance, decreased productivity, and poor professional image by participants in the program. The military spends money on specialized training for physicians, nurses, pilots, flight crews, and others -- only to have lost the investment through members' failure to meet weight and physical standards.

In summary, the Air Force WMP serves as a rehabilitative program for overfat individuals. However, the major emphasis of the program consists of punitive actions for being overweight rather than helpful mechanisms that teach individuals to lose weight. Except for a one-time medical evaluation and diet consult, the client receives no assistance or education in how to reduce weight healthily. Even the 90-day exercise program is optional and likely to be less than optimal. Exercise programs vary from military base to military base, and from squadron to squadron. For example, a fire fighting squadron may have a mandatory physical fitness time every other day at 0600 requiring every individual to participate in a 3-mile run. Other squadrons, such as the medical squadron, may have

practical constraints related to work schedules and patient care assignments that prevent organized physical exercise activity as a squadron. By necessity, WMP clients frequently develop and participate in their own version of physical exercise, which tends to vary greatly. In some cases, injuries occur due to lack of education on healthy exercise activities. This author proposed that augmentation of the WMP by a health care professional was necessary to analyze individual needs of WMP clients, identify resources, provide relational support, and coordinate services that facilitated progress through the program. The professional expertise of a nurse case manager was proposed as an effective way to facilitate WMP weight loss progress.

#### Nurse Case Management

Nurse Case Management is “a collaborative process that assesses, plans, implements, coordinates, monitors and evaluates options and services to meet an individual’s health needs through communication and available resources to promote quality, cost-effective outcomes” (Case Management Society of America, 1995, p.8).

There are no Air Force WMP programs using a nurse case management model. Nurse case management is fairly new to the Air Force, in which most nurses practice within an inpatient acute care setting. The nurse case manager for this study practiced in the military community and functioned primarily in the ambulatory care setting. Practicing within the community was based on similar civilian-based community nursing practices.

Carondelet Health Care in Tucson, Arizona, demonstrates a community-based nurse case management model that occurs beyond the walls of hospitals (Cohen, & Cesta, 1993). This model, initiated in 1985, emphasizes care across the continuum of care settings and mutual goal setting between clients and the nurse case manager. Michaels (1992) described the actions of the nurse case manager as working with patients over time, monitoring their health status at regular intervals, teaching them to manage and cope with their health concerns, and coordinating medical and community-based support. The Carondelet model is one in which the nurse case manager functions in the client's usual environment. The nurse case manager works to build the patient's self-reliance by respecting the patient's decisions and facilitating informed choices (Newman, Lamb, & Michaels, 1991). The most important aspect of nurse case manager is the relationship formed with the client, characterized by compassion, continuity, and respect for client's choices, with a focus on client-environment interaction (Newman et al., 1991).

The intervention for this study consisted of the roles of the nurse case manager as defined by the Case Management Society of America (CMSA, 1995) -- assessor, planner, implementer, monitor, and evaluator -- using a collaborative process. This collaborative process, combined with mutual goal setting by client and nurse case manager, was the intervention used to examine effectiveness of a case management program to facilitate weight loss in overweight clients. Clients in the WMP were part of the ambulatory care arena, a setting that created a good opportunity to manage care for a sub-population. A focus on ambulatory case management can lead to creativity in the ambulatory

environment (Hillman, 1994). Case management, geared to carefully identified subpopulations, can be a factor in improving quality and reducing costs (Hillman).

Population-based nurse case management is a process focused on sub-populations. Shamansky (1995) emphasizes the need to move from planning care for individuals to planning care for groups with similar problems or needs. Clients on the WMP are trying to lose weight to meet Air Force standards. Although individual needs varied from person to person, common problems are also present. The expected outcome is also the same for each WMP client -- weight loss. A consistent care plan for this population demands collaboration, teamwork and planning, implementing, and evaluating processes to improve health outcomes (Shamansky, 1995). According to Leath and Thatcher (1991), sometimes the totality of a client's needs and the ongoing nature of the needs are beyond the scope of the system (in this case, the WMP program). A case manager arranges for services to alleviate client problems through comprehensive assessment of health and psychosocial needs, provides direct service delivery, focuses on health promotion and disease prevention, coordinates resource referrals, makes service arrangements, and monitors clients' health status (Leath & Thatcher, 1991). The service arrangements include efforts toward attainment of client goals.

#### Goal Attainment

Goal attainment strategies can assist clients toward achieving health objectives (King, 1990). The partnership between the professional nurse case manager and the client with a chronic condition (failure to progress with weight loss) facilitates a patient outcome

related to goal attainment for desired weight loss. Nurse case management also places an emphasis on continuity and long-term relationships. Long term supervision of obese clients achieved better results than short term supervision (Shapiro, Weinkove, Coxon, Kreitzman, & Rodgers, 1989). It was proposed that the overweight client might benefit from the services of a nurse case manager practicing community-based case management within a goal attainment framework.

#### Statement of Problem

The problem addressed in this study was the issue of how to promote weight loss success of military personnel involved in the Air Force WMP. Failure to meet weight standards results in individuals being discharged from the military. Although the Air Force personnel center provided no data in the form of exact numbers, it was the general opinion of Air Force supervisory personnel that the Air Force loses many dollars in personnel resources, as well as mission readiness, training, and overall productivity, when trained personnel leave the Air Force due to weight program failure (Dobbs, personal communication, November 1995). The health and career implications of failing to meet Air Force standards for weight are significant for the military member. The member loses career and job opportunities. Complications from obesity-related illness affect overall health status of the military member. The military may lose an excellent Air Force member whose only deficiency was failure to remain below maximum allowable weight.

Another significant issue is the nation's changing health care industry and consequent reductions in military health professionals. The national trend and movement

toward managed care are also penetrating the military. Cost reduction efforts via managed care affect military personnel numbers by retaining only individuals who meet all physical requirements consistently and who do not become a burden on the military health care system. In an environment of cost containment, appropriate utilization of resources, and downsizing of the military, the uniformed services can not afford to lose qualified personnel unnecessarily to a condition that nurse case management may address.

#### Statement of Purpose

The purposes of this project were to describe: (a) the effect of nurse case management intervention in a weight management program, (b) comparison of changes in weight and body fat mass of nurse case managed clients and non-nurse case managed clients, and (c) frequency of goal attainment when goals were mutually established by clients and nurse case manager.

#### Significance of the Study

The significance of this study is the focus on early identification of client weight loss needs. A nurse case manager intervenes by assessing client weight loss needs, mutually setting weight loss goals collaboratively, planning a way to meet weight loss goals, assisting the client with resource identification, monitoring progress or lack of progress, and mutually evaluating services or activities related to goal attainment. The expected outcome is weight loss consistent with client goals. The current lack of a process to facilitate weight loss outcomes in the standard WMP makes this study a worthy project to determine impact of nurse case management. Currently, the individual's unit

commander supervises weight management for military personnel. The study could contribute to support for Air Force consideration of placing the WMP under the auspices of health care rather than personnel management. The results of this study add to the knowledge base for a new role for nurses. Nurse case management provides clinical care opportunities for nurses interested in elevating the health status of other populations in the ambulatory care arena.

Knowledge gained by studying the impact of nurse case management may have applicability for other sub- populations who are high volume, high risk groups. These groups may include asthmatics, diabetics, chronic pain sufferers, chronic heart disease, cancer, and others. Nurse case managers may assist military treatment facilities in cost containment and enhancing quality care delivery for a variety of target populations.

### Summary

Chapter I includes background on the importance of addressing the needs of overweight clients in the Air Force Weight Management program. Also included was a discussion of the problem – how to promote weight loss success of military personnel in the Air Force WMP. The study's purposes were to describe nurse case management effectiveness in a weight management program, compare weight and body fat mass changes in clients receiving services as usual vs. enhanced services, and describe the goal attainment of clients. Additionally, Chapter I included the ramifications of not addressing the weight loss needs of the military member in terms of health and career. These ramifications include clients having overweight-related illnesses and clients being

discharged from the military for failure to maintain weight standards. Air Force Quality issues of cost, quality, access to care, and choices are high priority items affecting the financial status, health status, use of services, and client decision-making for the military member. Through mutual goal attainment and a collaborative nursing intervention, nurse case management may facilitate positive outcomes for the client attempting to lose weight.

## CHAPTER II

### CONCEPTUAL FRAMEWORK AND REVIEW OF THE LITERATURE

Chapter II is a presentation of the conceptual framework for the Nurse Case Management intervention, a review of related research literature specific to medical-surgical nursing, the research questions, and definition of terms. Concepts from King's Goal Attainment Model (1990) provided the conceptual framework for the Nurse Case Management intervention in this study.

#### Conceptual Framework

##### King's Goal Attainment Model

Imogene King (1990) defined nursing as "the process of human interactions between nurse and client whereby each person perceives the other and the situation, and through communication, they set goals, explore means, and agree on means to achieve goals" (p. 80). King (1994) stated that interacting personal, interpersonal, and social systems provide a process of human interactions that lead to transactions and goal attainment. She also stated that this process helps individuals participate in goal setting that lead to goal attainment and represents outcomes. Goal attainment demonstrates a measure of effective nursing care (King, 1994).

Case management research has often documented improved outcomes but has lacked description of the process (Lamb, 1992). There is a need for research to explain how nurse case management interventions influence patient outcomes (Lamb, 1992). There is a largely anecdotal body of literature concerning nurse case management

(Marschke & Nolan, 1993). Previous studies measure the structure, process, and outcome separately rather than as a unified system (Marschke & Nolan, 1993). Researchers define structural variables as referring to the location of case management in an organizational setting and the type of personnel involved. Process variables generally refer to the implementation of case management in an organization, including the roles of case manager, support personnel, and patients. Outcome variables tend to reflect the impact of nurse case management on the quality of patient care.

The theoretical concepts within King's application of goal attainment to nursing are perception, communication, interaction, transaction, self, role, growth and development, time, personal space, and stress (King, 1990). Communication, interaction, transaction, growth, and development were concepts selected from King for the conceptual framework of this study.

King (1990) defines the concepts of communication, interaction, transaction, and growth and development as follows. Communication is a process whereby one person give information to another either directly or indirectly. Communication is the information component of the interactions. The exchange of verbal and non verbal signs and symbols between nurse and client, or client and environment, is communication (King, 1990). Interaction is a process of perception and communication between person and environment and between person and person, represented by verbal and nonverbal behaviors that are goal directed (King, 1990). Transactions are those purposeful interactions that lead to goal attainment (King, 1990). Growth and Development refer to

continuous changes in individuals at the cellular, molecular, and behavioral levels of activities conducive to helping individuals move toward maturity (King, 1990). Outcomes are client-centered, goal-oriented behaviors expected in clients (King, 1994).

#### Application of King's Goal Attainment Model

The conceptual framework for this study consisted of the concepts of interaction, transaction, communication, and growth and development from King's application of Goal Attainment Model (King, 1990). Within this framework, the nurse case manager performed the roles of assessor, planner, implementer, monitor, evaluator, and facilitator. A description of the conceptual definitions of the concepts as used in this study follows.

Interaction was the activity occurring between the nurse case manager and client/family simultaneously. This included the role function of assessing the client/family to identify specific weight loss needs. Interaction also included the relationship developed between nurse case manager and client/family. Transaction was the agreement made by the nurse case manager and client to set purposeful objectives of achieving Air Force weight standards as well as mutually setting individual monthly weight loss goals. The nurse case manager role of planning included this aspect of the intervention.

Communication was the verbal or written language used by a multidisciplinary health care team, including the client, to coordinate care, and provide information to meet the weight loss needs of the client. The role function of implementation was the process by which communication of the planned intervention and subsequent institution of the intervention occurred. Growth was the healthy weight loss behaviors demonstrated by the client. The

nurse case manager, as a monitor, documented new and changed weight loss behaviors.

Development was the weight status of the client at a specific point in time. Monthly measurements determined development toward weight loss goals. The nurse case manager, as evaluator, measured the number of pounds lost and the percentage of body fat loss. The expected outcome was increased weight, decreased weight, or unchanged weight.

Another outcome was the success or lack of success in goal attainment by the client. Goal attainment was a dichotomous variable answered by "yes" or "no". The nurse case manager, as facilitator, determined weekly achievement of goals by identifying "met goals or did not meet goals". For example, week one's goal may have been to establish a three-times-a-week exercise schedule with a personal trainer. At the next client/nurse case manager meeting, the researcher documented "met goal of establishing exercise schedule" or "did not meet goal of establishing exercise schedule". The nurse case manager also identified the role components used to facilitate the exercise schedule of the client (assessor, planner, implementer, and monitor).

The partnership between the professional nurse case manager and the client with a chronic condition (failure to progress with weight loss) was to facilitate goal attainment for desired weight loss. Outcome standards were client-centered, goal-oriented, and written in terms of the behaviors expected in clients (King, 1994). Outcome standards pertained to the end result of nursing care, that is, a measurable change in the client's health -- weight loss and decreased body fat. Client goal attainment reflected outcomes.

Concepts from Imogene King's Theory of Goal Attainment(1990) formed the framework used to guide the nurse case management intervention in this project. Client goal attainment measurements reflected nurse case management effectiveness.

Figure 1 represents King's concepts of interaction, transaction, communication, growth, and development as a way to combine these concepts to facilitate an outcome. The nurse case management concepts represent components of activities congruent with King's concepts and were operationalized in this study to reflect a combination of nurse case management activities to facilitate weight loss. Figure 2 depicts the conceptual framework for the nurse case management intervention, illustrating the independent and dependent variables at the construct, concept, and operational levels. The services as usual group receive a medical evaluation and a nutritional consult. The nurse case managed group receive services as usual plus weekly appointments with the nurse case manager. The dependent variables are weight, body fat mass, and goal attainment. Fitness is the Air Force's description of a military member who meets the weight and body fat standards as described in AFI 40-502 ( See Appendix A). Physical fitness is the ability to rapidly transform stored energy into work. The ability to do daily tasks efficiently, without undue fatigue, and have ample energy remaining for military contingencies, emergencies, and leisure pursuits (Air Force, 1994).

Weight is measured in pounds lost using a medical scale. Body fat mass is measured in percent of fat lost based upon a formula using body measurements in inches. A tape measure is used to measure body neck, waist, and hip sites. Goal attainment is the

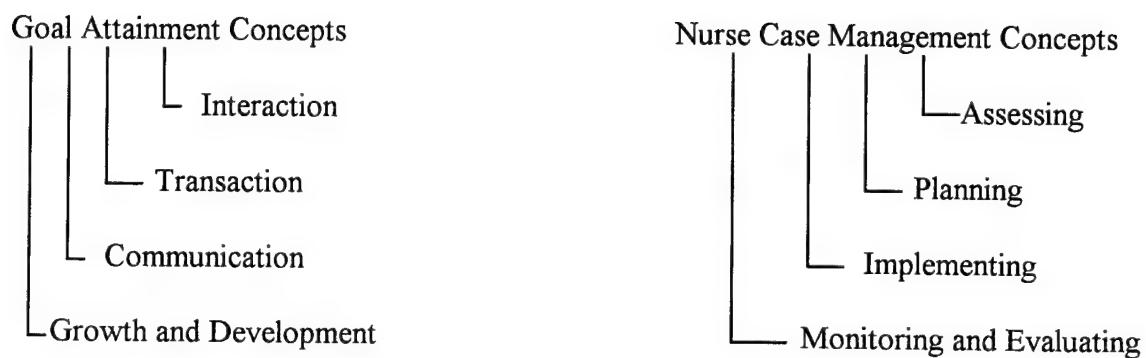


Figure 1: The Conceptual Framework Depicting Nurse Case Management Role

Intervention using Goal Attainment Concepts.

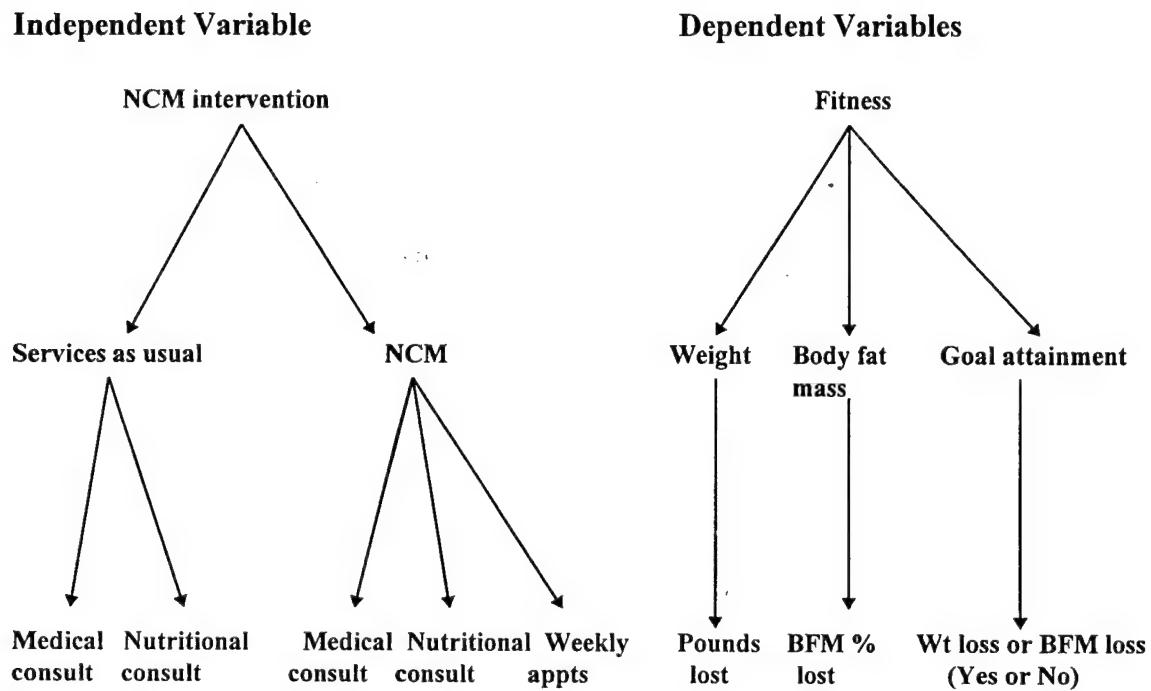


Figure 2 : The Conceptual Framework Depicting Nurse Case Management Intervention at the Construct, Concept, and Operational Levels

two month goal based on the Air Force minimum requirement for weight or body fat mass. Subjects meet goal if minimum monthly weight is lost or if minimum body fat mass is lost.

In summary, concepts from King's Goal Attainment framework were useful in describing nurse case management intervention when facilitating client weight loss efforts. Activities related to the concepts were ongoing. The mutual relationship between nurse case manager and client striving toward mutual goals was key to facilitating outcomes. The relationship evolved through the process of interaction.

#### Review of the Literature

The literature review includes reported nursing research related to the Air Force Weight Management Program, Nurse Case Management, goal attainment, and weight loss. There was little reported research on the WMP, use of goal attainment for nursing interventions, or nurse case management. There were reports of research on methods to reduce weight.

#### United States Air Force Weight Management Program

Only one study focused on an aspect of the United States Air Force Weight Management Program. Breitenbach (1990) compared physician's assistants (PA) with medical technicians on use of bioelectrical impedance to determine body fat. The focus was the use of physicians and physician assistants to determine body fat percentages during a medical appointment. It was posited that a waste of thousands of medical appointments occurred when PA's conducted a simple evaluation of body fat

determination rather than using appointment slots for evaluation of sick individuals.

Physician assistants and medical technicians measured body fat of military soldiers ( $N=113$ ) using bioelectrical impedance. Data analysis occurred using interclass correlation method. The researcher concluded that technicians adequately measured body fat, using bioelectrical impedance, which would release PA's to handle medical appointments.

Limitations of this study included the lack of description of bioelectrical impedance. It was unclear as to what was the real issue – method of body fat determination or type of staff used to take measurements. This study supported use of technical personnel to do body measurements.

#### Nurse Case Management

Mannon, Conrad, Blue, and Muran (1994) acknowledged the limited empirical research and lack of measurement tools to document effectiveness of case management. They conducted a retrospective chart review of clinical data among firefighters ( $N = 46$ ) over a 4 ½ year period for the purpose of identifying case management activities documented on patient charts. Donabedian's (1980) components of structure, process, and outcome provided the framework for the case management tool. The relevant aspect of this research was the investigator's operationalization of the "process" component. Process was operationalized as six Nurse Case Management (nurse case manager) components associated with facilitation of services for injured firefighters ( $N = 46$ ) and collaboration among professionals to achieve anticipated outcomes. The activities included identification, assessment, goal setting (in collaboration with care providers, fire

fighters, families, and attorneys), resource identification, collaborative communication (among team members), and evaluation (continuous monitoring of services).

Data analysis included frequencies, cross tabulations, and percentages. Of interest was the identification of nurse case manager activities in 54 reported injury cases. The chart reviews indicated assessment as authorization for payment and report of work status, discussion of work status with firefighters' supervisors, and recording of complete histories and social histories. The nurse case manager documented no vocational history. The nurse case manager documented goal setting which was referred to as return to work planning. The nurse case manager documented resource identification for physical therapy and also for a second medical opinion. The investigator did not document collaborative communication but all charts had evaluation documentation.

The importance of this study was in the identification of nurse case manager activities as they related to nurse case manager intervention planned for WMP clients. The authors identified nurse case manager strengths and weaknesses in documentation. The researchers advocated using a step by step process as a framework for conducting case management. A strength of this study was in its identification of current documented case management activities prior to implementing a formal case management program (Mannon et al., 1994).

In summary, a literature search resulted in one study relevant to the process of nurse case manager intervention for this study. The findings of this study indicated a need for more research to identify nurse case manager structure, process, and outcome

simultaneously and its impact on weight loss outcomes. The study focused on nurse case management research specific to process interventions, weight loss, or goal attainment.

### Goal Attainment

Blair (1995) conducted a study that examined mutual goal setting and operant behavior management. The researcher used a quasi-experimental design to test the effectiveness of three nursing approaches in fostering self-care behaviors in elderly nursing home residents ( $N= 79$ ). Random assignment of three intermediate-care nursing homes occurred as one of three conditions: A combination of mutual goal setting and behavior modification (Condition 1), mutual goal setting only (Condition 2), and routine nursing care (Condition 3). When comparison of the groups occurred at the end of 22 weeks, subjects who received the combination treatment performed significantly more self-care behaviors than those in the other two groups. A weakness of this study was the use of several nurses teaching behavioral modification and participating in mutual goal setting. Nursing efforts and intensity may have varied. Also, there existed no indication of the baseline ability of subjects' self-care behaviors. A strength of this study was the three-group design and the length of the study. There appeared to be enough discrimination among groups and enough time to detect a difference among the three groups.

In summary, published research on using goal attainment in nurse case management interventions is scarce. The one study identified indicated that a gap in knowledge exists regarding use of King's goal attainment concepts as a framework for interventions in nurse case management research.

### Weight Loss

Due to the many studies conducted on weight loss, the literature review for weight loss relative to this study centered on studies conducted using goal attainment strategies, exercise and/or nutritional strategies, weight control practices, and ongoing management strategies of adults. Six studies were relevant to the above.

Persons outside a healthy weight range have 143% higher hospital inpatient use than those in the healthy weight range (Donnelly, 1995). Levy and Heaton (1993) conducted a telephone survey of adults in the United States who were trying to lose weight. The objective was to estimate the relative prevalence of different types and combinations of practices among weight- loss practitioners and to describe the relationship between individual characteristics and various features of weight-loss regimens.

Participants ( $N = 1,431$ ) provided self-reports of 35 specific weight loss practices, motivations to lose weight, sources of information, and knowledge about diet and health.

Results indicated that respondents spent an average of 6 months of the previous year trying to lose weight. Weight loss goals strongly related to weight status. For both men and women, as body fat mass increased, so did the amount of weight they hoped to lose. Also important to note was data reflecting information-seeking behavior of overweight clients. Less than one third of the respondents reported looking for information about how to lose weight from expert sources such as physicians, nutritionists, and other health professionals.

The most prevalent types of weight loss practices included diet and exercise, use of vitamins and minerals, use of meal replacements, use of weight loss pills (such as diuretics, appetite suppressants, thyroid pills), formal weight-loss programs (such as commercial programs, hospital programs, clinics, or individual physicians), fasting, taking laxatives, using weight loss devices such as body wraps, surgery, and vomiting after eating. Exercise behaviors prevalent in survey respondents were walking approximately three hours per week, aerobic exercise, weight training, and exercise class. A major theme of the findings was the recurrent nature of weight loss attempts and the amount of time devoted to such attempts. Approximately 30% of persons trying to lose weight consisted of chronic dieters who had been on their weight loss plans for at least one year. This may have indicated the need for professional assistance to identify needs, plan strategies and coordinate services to facilitate permanent lifestyle behaviors to lose and maintain weight.

This study validated the use of anecdotal weight loss records and identified that individuals who are chronic dieters did not appear to be successful in permanent weight loss. The discovery of the lack of seeking out information from health professionals further supported the need for research in using professional nurse case management as an intervention for achieving desired weight loss. A major strength of this study was the anonymity of a telephone survey that may have encouraged subjects to be comfortable giving candid answers to weight loss practices. Yet, a weakness of using telephone surveys for research exists. Automatic elimination from the sample pool occurred for subjects without telephones.

A study conducted by Peters, et al. (1996) also identified questionable dieting practices by young adults (N = 418). Subjects from a random list received questionnaires to determine use of diet pills, diet powders, diets, vomiting after eating, or laxative use over the previous two years. Analysis of data occurred using ANOVA, Chi Square, and Spearman's correlation coefficients. Subjects reported regular use of the above practices for both men and women. Use of these practices can have long-term negative effects on health and may lead to eating disorders. The researchers advocated prevention and early intervention for healthful living.

Another study focused on weight loss practices (Bennett, 1991), using the Behavioral Risk Factor Surveillance System (BRFSS) to assess differences in weight-loss practices of overweight adults (N = 112, 108) by sex and race. The investigator conducted monthly telephone interviews of adults  $\geq 18$  years of age using standard questionnaires and random-digit dialing techniques. Respondents from 21 states participated. The analysis excluded pregnant women and used aggregated data. The investigator used prevalence ratios to assess differences in overweight and weight-loss practices by race for women and men. Weight loss practices identified were: increasing physical activity only, eating fewer calories only, both increasing physical activity and eating fewer calories, and not trying to lose weight.

Eating fewer calories and increasing physical activity were the recommended weight loss practices most frequently used, followed by eating fewer calories only. Overweight black women reported increasing physical activity only and "not trying to lose

weight" statements more frequently than overweight white women. Overall, weight-loss practices of overweight black women were not significantly different for overweight white women. For overweight men, the weight loss practice most frequently used was not trying to lose weight. Prevalence of other weight loss practices was somewhat lower for overweight black men than for overweight white men. Weight loss practices of overweight men were not significantly different by race.

There were several limitations in this study. Weight and height were self-reported and women tended to underreport while men tended to overreport (Bennett, 1991). Reported weight loss practice differed from actual practices. The interviews occurred with people who had telephones. People without telephones may have had a lower socioeconomic status and may also have had different weight loss practices as a result. Data are useful in anticipating intervening variables in the WMP study when planning interventions for clients of various ethnic backgrounds and their attempts at weight loss. Also significant to note is the limitation of clients' self-reporting behavior vs. observed behavior (Bennett, 1991).

Kramer, Jeffery, Forster, and Snell (1989) reported annual weight changes over four years and five years for two groups of participants from controlled weight loss trials originally conducted in 1980-1981. The purpose was to provide descriptive information about the course of weight regained over time and to study patterns of weight loss and gain that might have important clinical or theoretical implications.

The original study employed a 15-week behavioral oriented program including diet and exercise instruction, behavioral skills training, cognitive behavior modification, and relapse prevention training. Kramer et al. (1989) measured clients ( $N = 152$ ) at a clinic and expressed weight data in terms of percent weight change at one year time intervals. The results of the four year follow-up regarding weight maintenance indicated that weight loss during treatment was not related to long-term outcome in women ( $n = 38$ ). For men ( $n = 114$ ), initial weight and percent overweight were not related to short or long term outcome. Only 0.9 percent of the men and 5.3 percent of the women maintained their initial weight loss throughout the follow-up period.

The overall findings of the study indicated poor long-term stability of weight losses produced by behavioral therapy alone. There were few gender differences related to weight stability in this study. The authors suggested the need for comprehensive programs, including community intervention, that have an element of continued followed up (Kramer et al., 1989)

Williamson, Serdula, Anda, Levy, and Byers (1992) conducted a survey in a population-based, multi-state health practice. The purpose of the study was to describe the age- and race-specific prevalence of weight loss attempts, the goals and duration of such attempts, and the rate of weight loss achieved. Data were from the 1989 Behavioral Risk Factor Surveillance System cross-sectional survey of 39 states and the District of Columbia. There were 64, 637 respondents trying to lose weight, trying to maintain

weight, or doing neither. Of particular interest were the results of the data collected on weight loss goals and achieved weight loss. ANOVA was used to analyze data.

Among men ( $n = 6,758$ ) trying to lose weight, mean weight at the start of the weight loss attempt was 209 pounds; the mean goal weight was 178 pounds, for a mean weight loss goal of 30 pounds. Among women ( $n = 14,915$ ) trying to lose weight, mean starting weight was 164 pounds and the mean goal weight was 133 pounds, for a mean weight loss goal of 32 pounds. The researchers noted a higher weight loss goal in people with heavier body fat mass indexes.

In terms of achieved weight loss, men trying to lose weight for more than one year had a mean loss of 12 pounds. Among women trying to lose weight for more than a year, the mean loss was 8.8 pounds. There was little relationship between race and the rate of weight loss. Limitations of this study were similar to those of Bennet's (1991) study. Data were self-reported. Only people with telephones were able to participate in the study. Also, data reflected weight loss amounts over one year. It was not clear if individuals were dieting constantly or using other methods of weight loss. However, the results did indicate that clients may set higher goals than what realistically may be achieved in a given time frame.

Some reports of studies indicated the need for "something else" as well as diet, exercise, or both. Skender et al. (1996) conducted a randomized experimental study of overweight men and women ( $N = 127$ ) on the effects of three cognitive-behavioral weight control interventions for adults. The interventions were diet only, exercise only, and a

combination of diet and exercise. The outcome measure was change in body weight at a two-year follow-up. ANOVA for weight changes and repeated measures ANOVA were used to analyze trends. At one year, no significant differences were noted among the three groups. During the second year, the diet-only group regained weight above baseline, the combination group regained to slightly below baseline, and the exercise-only group regained to slightly below baseline.

No significant difference in weight status was noted among the treatment groups two years after the initial program. However, there were significant differences among the treatment groups in weight regain trends over the two-year period. During the second year when there was no contact with instructors, the diet-only and combination groups experienced weight gain, whereas the exercise-only group maintained their weight losses. Although this study was limited by a small sample size, the results appeared to indicate the need for further research into other factors besides diet and exercise influencing weight loss and maintenance (Skender et al., 1996).

In conclusion, there were six studies addressing weight loss. Most authors concluded that weight loss using behavioral therapy require more than diet and exercise alone to facilitate weight loss and weight maintenance. There were studies identifying weight loss practices of adults. However, there were no studies on nursing case management and none on its applicability to the overweight population. There were no reported studies on the effectiveness of the Air Force Weight Management Program as a rehabilitation program to encourage weight loss. There were few studies using goal

attainment as a way to facilitate client health outcomes. A major weakness in several studies was the lack of description of interventions used with subjects. Several interventions were telephone-based surveys that precluded subjects without telephones. The review of literature indicates a need for research on nurse case management as a process to promote healthy weight loss outcomes through goal attainment.

#### Alternative Hypotheses

1. Nurse case managed subjects will lose more weight than services as usual subjects after two months.
2. Nurse case managed subjects will lose more body fat than services as usual subjects after two months.
3. Nurse case managed subjects will achieve goal attainment whereas services as usual subjects will not.

#### Definition of Terms

The following are definitions of terms used in the hypotheses for this study:

1. Nurse Case Managed subjects (nurse case managed group): those who received the nurse case manager intervention in conjunction with the services as usual for the Air Force Weight Management Program.
2. Weight Loss: number of pounds lost from baseline weight.
3. Services As Usual: standard Air Force Weight Management Program that involves a medical evaluation by a physician and a dietary consult by a dietitian.

4. Services As Usual subjects (services as usual Group): those enrolled in the standard weight management program with no interaction with the nurse case manager.
5. Body Fat Loss: decrease in percent of body fat mass from subject's baseline.
6. Goal Attainment: meeting a two month goal, which was the number of pounds lost or percentage body fat lost as pre-established by client and nurse case manager. The two month goal was based on the Air Force minimum weight criteria: one percent body fat loss for men and women each month, or a three pound weight loss for women and a five pound weight loss for men each month.

### Summary

Chapter II introduced the conceptual framework and the application of the framework for this study. King's Goal Attainment concepts were conceptually and operationally defined for the nurse case management intervention. In the review of the literature, a gap exists in research linking nurse case management to client goal attainment. There is much literature on behavioral studies regarding weight loss, but few studies on using a comprehensive approach like nurse case management to address the complex needs of the overweight client. The hypotheses for this study address the identified gap in the literature.

## CHAPTER III

### METHOD

This chapter is a presentation of the study design, setting and sample, and protection of rights of human subjects. This chapter also includes a description of the data collection procedures consisting of subject interviews, nurse case management intervention consisting of a twelve step procedure, the case management log, the client intervention log, other NCM activities, and physical measurements. Chapter III concludes with the plan for data analysis.

#### Design

The research design was quasi-experimental. A convenience sample of military members enrolled in the study. Subjects were military members enrolled in Phase I of the Air Force Weight Management Program (WMP). Persons in the WMP exceeded the Air Force standard for body weight or body fat mass (BFM). Phase I of the WMP was the initial entry and body fat loss period as described in the background section of Chapter I.

Subjects were randomly assigned to the services as usual group or to the nurse case managed group. The comparison groups were the nurse case managed group and the services as usual group. Nurse case management (NCM) was the intervention used in the experimental group only. The dependent variables were weight loss (in pounds), body fat mass loss (in percentage), and subject goal attainment. The research assistant measured weight and body fat mass at the start of the study for a baseline. The nurse case manager and subjects mutually set a two-month goal. The goal was based upon the Air

Force minimum monthly weight loss requirement as per AFI 40-502 and was as follows:

(a) three pounds for women per month and five pounds for men per month or (b) 1% body fat loss for men and women per month.

At the end of the two month study, the research assistant measured weight and body fat mass again. The investigator measured evidence of the two month goal attainment by documenting “Yes, goal met” or “No, goal not met”. The two month goal was met if the subject lost the minimum number of pounds required monthly by the Air Force or if the subject lost the minimum percentage of fat required monthly by the Air Force. For example, if a male subject weighed 200 pounds, the subject must weight no more than 190 pounds at the end of the next two months. If the male subject did not lose 5 pounds over two months, he could attain the goal by losing 2% body fat by the end of the next two months. Data analysis compared the services as usual group and the nurse case managed group on weight change in pounds lost, body fat mass decrease in percentage, and achievement of subjects’ goals.

#### Setting

The setting was a military base that was appropriate because the base had a large number of people enrolled in the WMP and personnel followed AFI 40-502 guidelines to manage the WMP. The nurse case manager’s practice was housed in the Health Promotion Office. Subjects assigned to the services as usual group met with a physician for a medical evaluation and met with a dietitian for a nutritional consult at the base hospital. A 90-day

exercise program was also an option for the services as usual group, but at the discretion of the subject's supervisor.

Subjects assigned to the nurse case managed group received services as usual and met with the nurse case manager in the Health Promotion Office for weekly interviews. The nurse case manager conducted nutrition and exercise sessions, exercise evaluations, and made referrals from the Health Promotion Office. Measurements for weight, body fat mass, and goal attainment occurred at the Health Promotion Office.

#### Sample

The investigator obtained a convenience sample of 38 from the total group of 95 military personnel enrolled in Phase I of the WMP. Sample eligibility criteria were: at least 18 years of age; able to speak and read English, and enrolled in Phase I of the WMP. Phase I members were above the maximum weight allowance and were mandated to lose weight.

In an attempt to ensure random selection of subjects, the 95-member list of names was labeled 1-95. Using a table of random numbers, the investigator re-coded potential subjects from the list to establish a random telephone calling order. For example, if the first number from the random table was 30, the thirtieth person on the list was re-coded as number one. This person was called first. This random selection process continued for the entire list of names.

Starting with number one, the investigator called each person three times for the purpose of verbal contact. If the person was not available, then the investigator left a

message requesting a return telephone call. The investigator continued to telephone members until the 95-member population list was exhausted. Upon reaching number 95, the investigator returned to the beginning of the list to telephone persons who were not orally contacted initially. This process contributed to a convenience sample of 38 subjects. Upon completion of telephone calls to the 95- member population, the investigator noted the outcome of each telephone attempt. The result of the telephone contact is in Chapter IV.

The investigator scheduled an appointment date and time for each person who agreed to participate in the study. The purpose of this appointment was for informed consent, baseline measurements, establishment of goals, group assignment, and appointment scheduling. The investigator informed subjects of random assignment procedures prior to selection for the groups.

After initial baseline measurements were taken by the research assistant, each subject drew a number from a basket for group assignment. There were 16 slips of paper labeled as number one (services as usual group) and 16 slips of paper labeled as number two (nurse case managed group). The 38 subjects drew a number from this pool. Each number was returned to the basket after each drawing. The nurse case managed group received nurse case management and usual services. The services as usual group received no case management intervention. All subjects set a two month goal based upon the Air Force minimum monthly criteria. Sample size was 38, with 16 in the services as usual group and 22 in the nurse case managed group. The a priori alpha level was 0.05, beta

level was 0.20, and the power was 0.80. The researcher did not know the effect size for the assigned intervention on weight, body fat loss, and goal attainment. Therefore, the investigator used Cohen's large effect statistic.

#### Protection of Human Subjects

Prior to data collection, The University of Arizona Human Subjects Committee gave approval for the study (see Appendix H). Davis-Monthan Air Force Base gave approval for access to subjects (see Appendix I).

For each person who agreed to participate in the study, the researcher verbally explained the purpose of the study, and gave to each subject a disclaimer. (see Appendix J). To ensure confidentiality, a code number was used on all forms. There were no known psychological or physical risks. The only possible benefit was the opportunity to contribute to knowledge.

#### Data Collection Procedure

For both services as usual and nurse case managed groups, the research assistant measured baseline weight and baseline body fat mass. The nurse case manager and subject established the two month weight loss goal at the initial interview (see Appendix K). Goals included the mandatory Air Force standards -- ability to lose 3 (females) -- 5 (males) pounds or 1% body fat each month as outlined in AFI 40-502. The research assistant recorded measurements as directed by AFI 40-502.

After group assignment, the investigator instructed the services as usual group to continue their current weight loss efforts. All subjects completed the Air Force nutritional

consult and medical evaluation prior to baseline measurements. The medical evaluation and one-time nutritional consult constituted the services as usual treatment. The investigator contacted each subject in the nurse case managed group by telephone to schedule the first week's appointment. At the first appointment, subjects received an overview of the nurse case management intervention. The nurse case manager assessed and identified weight loss needs. Next, the subject and nurse case manager set the first week's behavioral goal and developed a plan for achieving this goal. The subject and nurse case manager scheduled the next weeks' appointments.

#### Nurse Case Management Intervention

The nurse case management intervention was carried out completely and consistently for all subjects in the nurse case managed group. Subject participation in the nurse case management intervention was voluntary. A procedure involving twelve steps provided the basic weight loss plan for the nurse case managed subjects. The nurse case manager also conducted activities based upon individual needs of the subjects.

#### Twelve Step Procedure

The nurse case manager carried out the following procedures for a basic weight loss plan for subjects in the nurse case managed group. The twelve-step detailed procedure used during client encounters with the nurse case manager follows.

1. Nurse case manager met with subjects each week and used process components of nurse case management to address subjects' weight loss needs.

2. Nurse case manager identified weight loss focus: (a) nutrition, (b) exercise, (c) personal lifestyle concerns, or (d) any combination of the above.
3. Nurse case manager initiated referrals to other health care team members if necessary.
4. Nurse case manager scheduled subject attendance for nutritional sessions, exercise evaluations, and exercise sessions.
5. Nurse case manager scheduled subjects' final measurement appointments.
6. Nurse case manager used Client Intervention Log (see Appendix L) to record nurse case management process components (assessment, planning, implementing, monitoring, evaluation) and subject outcomes related to each component of the intervention.
7. Nurse case manager and subjects set weekly goals and planned strategies for weekly behavioral goal attainment.
8. Nurse case manager conducted NCM intervention by using assessment, planning, implementing, monitoring, and evaluation components to facilitate subject goal attainment.
9. Nurse case manager implemented subject weight loss plans by coordinating services, when necessary, and assisting subjects toward meeting goals.
10. Nurse case manager documented NCM intervention and time spent conducting each component of the intervention—assessment, planning, implementing, monitoring and evaluating.

11. Research assistant measured subjects at the end of the two month study and recorded the data.
12. Nurse case manager evaluated goal progress at the end of two months by identifying weight or body fat loss. The two month goal attainment was described as "met goal" or "did not meet goal". Goal attainment consisted of subjects meeting two times the minimum monthly criteria for weight loss and body fat mass as established by AFI 40-502.

#### Nurse Case Management Activities

In addition to the twelve steps, the nurse case manager provided weight loss literature to all subjects. The nurse case manager also accepted telephone calls at home, met subjects at the base fitness center upon request, and interacted with subjects during unscheduled appointment times. In several instances, the nurse case manager intervened with job supervisors, upon the subject's behalf, to assist with participation on their weight loss program.

The nurse case manager provided an opportunity for subjects to participate in the following activities within the intervention: (a) weekly one-on-one appointments with the NCM, (b) a nutrition education session, (c) an exercise education session, (d) an exercise evaluation, and (e) referrals. Each week, subjects and nurse case manager set nutrition, exercise, or personal behavioral goals based on individuals' care plan focus. The nurse case manager identified a care plan focus related to nutrition, exercise, personal lifestyle concerns, or a combination of the three. The nurse case manager devised a

weight loss plan for three subjects who required a nutrition and exercise focus, and for eleven subjects who required a combination of nutrition, exercise, and attention to personal concerns. In addition, the NCM made health care referrals to other health care team members on the subjects' behalf. These referrals were to physicians, physical therapists, mental health specialists, dietitians, exercise physiologists, and aqua therapists. The nurse case manager also collaborated with other health team members about counseling issues that arose during weekly appointments.

During weekly appointments, the nurse case manager documented time spent assessing, planning, implementing, monitoring, and evaluating on the Client Intervention Log. The nurse case manager used a stopwatch to monitor time spent in each component of the NCM process during interactions with subjects. Time spent interacting with subjects apart from the weekly scheduled appointments were also documented. The nurse case manager spent over 16 hours in assessment and relationship building; over 7 hours in planning; over 6 hours in implementing; and over 10 hours in monitoring and evaluation. The nurse case manager experienced difficulty in separating monitoring activities from evaluating activities exclusively. The investigator noted King's (1990) description of growth and development as one concept. Therefore, monitoring and evaluation was documented as one concept. The nurse case manager spent over 10 hours monitoring and evaluating subjects' weight loss program. Over 15 additional hours were spent interacting with subjects in nurse case manager-as-recipient encounters. Figure 3 depicts the amount

of time, in minutes, the nurse case manager spent in each component of the case management processes.

The nurse case manager conducted nutrition sessions for nurse case managed subjects in informal group sessions held at various times during the week. The nurse case manager distributed nutrition literature and subjects shared nutritional concerns, in addition to information on nutritional topics such as food label reading, recipe modifications for low fat meals, portion sizes, and fluid intake.

A classroom setting with exercise equipment provided an informal environment for sharing exercise strategies. The exercise sessions were in a group setting and were offered at various times during the week. The nurse case manager used free weights to demonstrate exercises and safe weight lifting, and facilitated discussion by subjects about topics such as fitness equipment, duration and intensity of exercise workouts, and metabolism. Occasionally, the nurse case manager provided an opportunity for evaluation of subjects' exercise regime at the base fitness center.

#### Instruments

##### Client Intervention Log

The nurse case manager documented encounters on the Client Intervention Log (see Appendix L), using a combination of narrative and checklist formats. The nurse case manager used this at each weekly session and between sessions when doing any type of communication with the subject, in addition to recording the time spent performing activities related to each component of the NCM process.

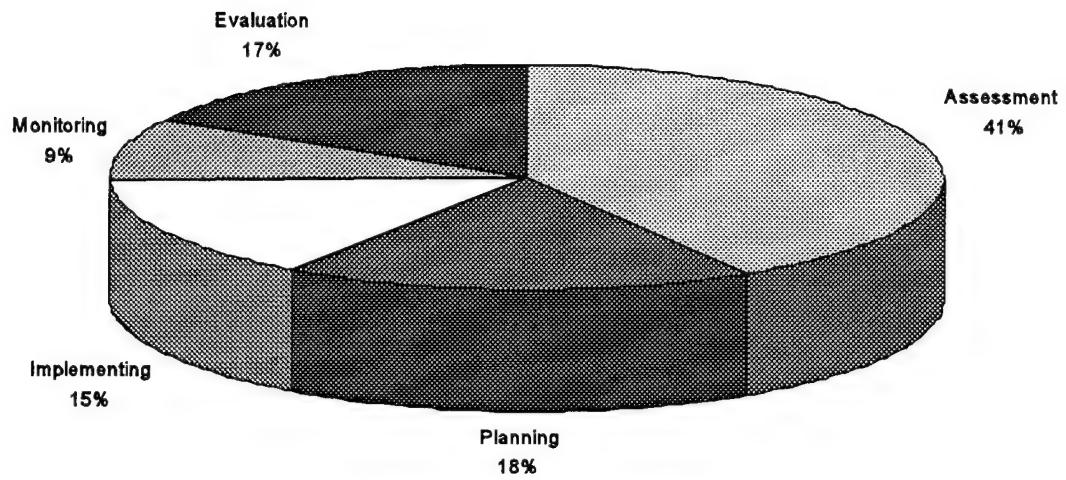


Figure 3. Description of total amount of time spent in each component of the nurse case management process with subjects. Time includes all client encounters. Assessment = 978 minutes, Planning = 438 minutes, Implementation = 359 minutes, Monitoring = 211 minutes, Evaluation = 394 minutes.

### Scale

A medical balance scale was used to measure subject body weight in pounds. The research assistant weighed the client with shoes off, in a military uniform, and with contents of pockets emptied, subtracting three pounds for clothing. Measurement was recorded in whole units rounded up to the nearest unit. The scale manufacturer, Healthometer of Bridgeyou, IL, determined reliability and validity of the instrument. The specifications are as follows: Serial number – 32394019, ID number – 5932 Model 400 Balance Scale. The Military Equipment Repair Company (MERC) calibrated the scale each month to assess and maintain accuracy. The calibration occurred by using a standard size metal weight supplied by the manufacturer. The standard weight was placed on the medical balance scale. The numbers on the scale were calibrated to exactly match the standard weight.

### Tape Measure

A non-stretching tape measure was the instrument used to determine body fat percentage. Measurement of the neck circumference for both men and women was at a point below the larynx. For women, the research assistant measured the natural waist circumference and the buttock circumference on bare skin. By adding the waist and buttock measurement, then subtracting the neck measurement from the sum, the research assistant determined the body fat percentage. For men, the research assistant measured the abdominal circumference at the navel on bare skin. Subtracting the neck measurement from the abdominal measurement determined body fat percentage. To assure reliability in determining measurements, each research assistant received an additional two day training

on how to take measurements accurately. The measurement procedure, as described, conformed to Air Force guidelines on determining weight and body fat mass. The research assistant's primary job in the Air Force was weight management monitoring. The research assistant conducted these measurements on a daily basis. After the two-day training, return demonstrations helped assure reliability of the observer. The investigator conducted return demonstrations weekly for eight weeks.

#### Goal Attainment Checklist

Goal attainment was measured by the answers, "Yes, I met goal" or "No, I did not meet goal," after two months. Secondary goals were individual weekly goal attainments of the nurse case manager and subjects during the intervention. The nurse case manager documented weekly goal attainment in the evaluation section of the Client Intervention Log by indicating a checkmark under the appropriate column (see Appendix M).

#### Plan for Data Analysis

Measurements of central tendency and dispersion described demographic characteristics. The investigator compared change scores using two sample independent t-tests. Chi Square was used to analyze goal achievement. Analysis of data for each alternative hypothesis was as follows:

1. Nurse case managed subjects will lose more weight than services as usual subjects after two months.

A paired t-test compared baseline to final measurements of weight in pounds for each group.

A two sample independent t- test compared change scores between the mean weight loss for the two groups.

2. Nurse case managed subjects will lose more body fat than services as usual subjects after two months.

A paired t-test compared baseline to final measurement of percentage body fat for each group.

A two sample independent t- test compared change scores between mean body fat loss amount for the two groups.

3. Nurse case managed subjects will attain a two month goal whereas services as usual subjects will not.

Chi-square tests examined the relationship of assigned treatment and the frequency to goal attainment for both weight in pounds or percentage body fat. Frequency was the number of times subject met pre-established monthly goal weight over two months based on measurement in pounds and/or measurements of body fat percentage.

Monthly goals were based on Air Force minimum weight loss requirements: One percent body fat loss per month for men and women, three pound weight loss for women, and five pound weight loss for men.

### Summary

Chapter III was a description of the method for this study, including design, setting, sample, protection of human subjects, data collection, NCM activities, instruments, and data analysis. There was a description of the plan for NCM intervention with the

experimental group and a description of forms used for documentation of the intervention.

Delineation of the data collection procedure occurred in twelve steps for all experimental group subjects, including narrative and checklist documentation and measurement of outcomes. Chapter III also provided examples of interactions that occurred in addition to the twelve steps. The nurse case manager conducted activities in a group setting and on an individual basis. The plan for data analysis was to determine the difference within each group for change in mean weight loss and body fat loss, the difference between the control group and the experimental group on weight loss and body fat loss, and frequency of goal attainment.

## CHAPTER IV

### RESULTS

The results of the data analysis are divided into three sections. The first section is a description of the sample characteristics. The second section is a description of sample characteristics related to subject participation in the nurse case management intervention. The third section is a presentation of the results of data analysis for each research hypothesis, indicating the effect of nurse case management on weight loss and client goal attainment.

#### Description of Sample

The sampling frame included 95 potential subjects who met the criteria as active duty men and women enrolled in Phase I of the Air Force WMP. The results of the sample selection process are presented in Table 1. Sixty-two prospective subjects were contacted and 38 agreed to participate in the study. These 38 constituted the sample at baseline for the study. Sixteen subjects were randomly assigned to the services as usual group and 22 subjects were randomly assigned to the nurse case managed group.

Although 38 subjects participated for eight weeks, the final sample consisted of 26 subjects because only twenty-six subjects completed the study by returning for the final weight, body fat, and goal attainment measures. Table 2 is a description of the final sample and the reasons for non-completion of the final measurements. Demographic characteristics for the final sample ( $N = 26$ ) are presented separately for the services as usual group and the nurse case managed group. The rank and gender information for

Table 1

Results of Sample Selection from the Population That Met Criteria (N = 95)

Results of Subject Recruitment	Number From Total Sampling Frame (N=95)	
	Frequency <sup>a</sup>	% <sup>b</sup>
Declined participation	10	10.5
No return call to 3 messages	16	16.8
Did not return call after initial contact	4	4.2
TDY ( temporary duty yonder) <sup>c</sup>	5	5.3
Discharged from military due to overweight	7	7.4
In phase 2 of weight program	6	6.3
No answer at job after three attempts	7	7.4
Relocated to different job (no current phone #)	2	2.1
Agreed to participate	38	40.0

Note. Thirty-eight people agreed to participate. Sixteen were assigned to the services as usual group and 22 were assigned to the nurse case managed group.

<sup>a</sup>The total number of potential subjects was 95.

<sup>b</sup>The total percentage of potential subjects was 100%.

<sup>c</sup>TDY (temporary duty yonder): working out of local area.

Table 2

Reasons for Non-Completion of Final Weight, Body Fat, and Goal Measurements (N =38)

Reasons	Services As Usual Group (n = 16)		Nurse Case Managed Group (n = 22)	
	Frequency	%	Frequency	%
Missed appt	2	12.5	4	18.2
TDY	1	6.2	2	9.1
Dropped	0	0	1	4.5
Pregnant	1	6.2	0	0
Invalid pre-wt	0	0	1	4.5
Totals	4	25%	8	36%

both groups was provided with the initial population list. Males (53.8 %, n = 14) were a slightly larger part of the sample than females (46.2%, n = 12). Enlisted military rank (96.2 %, n = 25) outnumbered officer military rank (3.8 %, n = 1).

The interviews of nurse case managed group (n = 14) members revealed additional demographic data for age and number of entries into Phase 1 of the WMP. The age of the nurse case managed group (n = 14) members ranged from 21 to 40 years (M = 30.3, SD = 5.8). Over half of the subjects in the nurse case managed group demonstrated more than one entry into Phase 1 of the WMP throughout their military career. Six subjects (42.9%) were in Phase 1 for the first time. Six subjects (42.9%) were in Phase 1 for the second time. Two subjects (5.3%) were in Phase 1 for the third time. A total of 14 subjects was enrolled in Phase 1 of the weight management program.

#### Sample Characteristics Related to Nurse Case Management Intervention

The nurse case manager conducted a twelve step procedure for weight loss planning and conducted other individual NCM activities to facilitate subject weight loss. A description of the sample characteristics related to participation in the nurse case management intervention follows.

Among the 14 subjects, a total of 64 weekly appointments were conducted with the nurse case manager. The nurse case manager and subjects set a total of 40 weekly goals and subjects met a total of 36 weekly goals. Thirteen subjects attended the nutrition session and one person did not attend. Ten subjects participated in exercise evaluations conducted by the nurse case manager. Four subjects did not participate in exercise

evaluations. Three subjects requested a second evaluation toward the end of the study. Four subjects attended exercise educational sessions. Ten subjects did not participate. Nine subjects received referrals to other health care team members to facilitate weight loss.

### Results of Data Analysis for Alternative Hypotheses

#### Hypothesis 1

The first alternative hypothesis was: The nurse case managed group will lose more weight than the services as usual group after two months. This hypothesis was studied using two steps. First, a paired t- test was used to compare baseline weight before the assigned intervention and final weight after the intervention for services as usual group and for nurse case managed group. There was no statistically significant difference ( $p = .16$ ) between the pre-weight ( $M = 200.0$ ,  $SD = 32.0$ ) and the post-weight ( $M = 196.3$ ,  $SD = 32.0$ ) for services as usual group. There was a statistically significant difference ( $p = .01$ ) between the pre-weight ( $M = 198.1$ ,  $SD = 20.9$ ) and the post-weight ( $M = 193.0$ ,  $SD = 21.5$ ) for nurse case managed group. A two sample t- test compared the mean weight change for both groups. There was no statistically significant difference ( $t = .57$ ,  $df = 24$ ,  $p = .58$ ) between the mean weight loss ( $M = -3.6$ ,  $SD = 8.2$ ) for services as usual group and the mean weight loss ( $M = -5.2$ ,  $SD = 6.4$ ) for nurse case managed group.

#### Hypothesis 2

The second alternative hypothesis was: The nurse case managed group will lose more body fat than the services as usual group after two months. This hypothesis was examined in two steps. First, a paired t-test was used to compare baseline body fat mass

before the assigned intervention to final body fat mass after the intervention for services as usual group and for nurse case managed group. There was a statistically significant difference ( $p = .01$ ) between the pre-body fat mass ( $M = 31.5$ ,  $SD = 5.3$ ) and the post-body fat mass ( $M = 29.5$ ,  $SD = 4.9$ ) in services as usual group. There was a statistically significant difference ( $p = .00$ ) between the pre-body fat mass ( $M = 32.5$ ,  $SD = 5.9$ ) and the post-body fat mass ( $M = 29.8$ ,  $SD = 5.9$ ) in the nurse case managed group. A two sample t-test was calculated to compare the mean body fat loss for both groups. There was no statistically significant difference ( $t = .71$ ,  $df = 24$ ,  $p = .49$ ) between the mean body fat loss ( $M = -2.0$ ,  $SD = 2.3$ ) for services as usual group and the mean body fat loss ( $M = -2.7$ ,  $SD = 2.7$ ) for the nurse case managed group.

### Hypothesis 3

The third alternative hypothesis was: The nurse case managed subjects will attain a two month goal whereas services as usual subjects will not. On Chi square analysis, there was no statistically significant relationship between the two groups  $\chi^2$  (1,  $N = 26$ ) = .02,  $p = .90$ .

### Summary

Chapter IV included the characteristics of the sample and the results of the data analysis. First there was a description of the results of the sample selection from the total population of 95 potential subjects. Thirty-eight subjects participated in the eight week intervention (services as usual group,  $n = 16$ ; nurse case managed group,  $n = 22$ ). Only twenty-six subjects returned for final measurements of weight, body fat, and goal

attainment. Thus, final data were analyzed on 26 subjects who completed the entire study. Demographic characteristics were described on both groups. There were more descriptive data on the nurse case managed group because each subject was interviewed.

Regarding the results of data analysis for each hypotheses, the t-test results indicated a significant weight loss in the nurse case managed group but no significant weight loss in the services as usual group. However, when a two sample t-test was used to compare the two groups, there was no significant difference in the amount of weight loss. The amount of body fat mass loss was statistically significant for both groups. Yet, when the two groups were compared using a two sample t-test, there was no significant difference in amount of body fat mass loss between the groups. Chi-square analysis indicated no significant relationship between the nurse case managed group and the services as usual group in the two month goal attainment toward weight or body fat loss.

## CHAPTER V

### DISCUSSION

Chapter V is a discussion of the results of this study in relation to King's Goal Attainment concepts and in relation to the literature reviewed on goal attainment, nurse case management, weight loss, and the Air Force Weight Management Program. The chapter also includes implications for nursing, limitations of the study, and recommendations for future research.

#### Relationship of Results to Conceptual Framework

This study determined the impact of nurse case management on client weight loss, body fat loss, and goal attainment. The nurse case manager used four of King's Goal Attainment concepts to guide the intervention process. Goal setting was an integral part of the weekly encounters with subjects. The subject and nurse case manager mutually set goals each week based upon nutrition, exercise, personal lifestyle concerns, or any combination of the above. Subjects attempted to achieve goals prior to the following week's meeting. Occasionally, goal attainment required more than one attempt or more than one week.

In King's (1990) framework, interaction is a process of perception and communication between person and person, represented by verbal and nonverbal behaviors that are goal directed. The nurse case manager assessed each subject and obtained detailed personal histories. The subject also had an opportunity to assess the nurse case manager. The first interaction established the foundation for relationship building. The nurse case

manager communicated program information and the goal-setting process to subjects in relation to their individual weight loss plans.

King(1990) described transactions as those purposeful interactions that led to goal attainment. The nurse case manager and subject demonstrated transactions by purposefully planning activities related to their individual weight loss plans. The planning component of the process included weekly appointments, scheduling of nutrition sessions, exercise evaluations, exercise sessions, referrals, and weekly goal setting. The nurse case manager evaluated client exercise activities in relation to aerobic capacity, cardiac workload, exercise intensity, and exercise duration. The overall focus of client weight loss plans related to nutrition, exercise, personal lifestyle concerns, or a combination of the three.

King (1990) described communication as a process whereby one person gave information to another either directly or indirectly. Communication was the information component of the interactions. The investigator operationalized communication as the implementation component of the nurse case management process. It included information gathering and sharing among other members of the health team and subjects.

King (1990) defined growth and development as continuous changes in individuals at the cellular, molecular, and behavioral levels of activities... conducive to helping individuals move toward maturity. The investigator operationalized growth as the healthy weight loss behaviors demonstrated by the client.

In summary, King's (1990) goal attainment concepts of interaction, transaction, communication, and growth and development provided the framework for the nurse case

manager process components of assessment, planning, implementing, and monitoring and evaluation. The nurse case manager spent more time in the assessment and relationship building than any other component of the nurse case manager process. Interestingly, the nurse case manager documented time spent in other interactions that could not be neatly categorized under the conceptual framework concepts: Interaction (assessment), transaction (planning), communication (implementing), and growth and development (monitoring and evaluating).

#### Relationship of Results to Literature Review

This section is a review of results as related to the literature review on research on Nurse Case Management interventions, goal attainment strategies used in nursing interventions, and weight loss specific to nutritional and exercise strategies, weight control practices, and ongoing weight management.

#### Nurse Case Management

This study partly supported Mannon's (1994) description of nurse case manager process documentation. Mannon's (1994) data analysis described documentation for assessment, goal setting, resource identification, and evaluation, with results indicating no documentation of client vocational history or collaborative communication. This investigator documented assessment, including client history taking, goal setting, referrals (similar to resource identification), communications, and evaluations. The investigator documented the nurse case manager process and identified the impact on client weight loss outcomes. The investigator adequately documented nurse case manager process

components involved in the nurse case management intervention. The most frequent documentation occurred in the assessment component of the nurse case manager process.

#### Goal Attainment

The nurse case manager used goal attainment strategies in two ways. First, weekly goal setting and goal evaluation occurred in relation to client nutritional, exercise, and personal lifestyle plans. Subjects set 40 weekly goals and met 36 weekly goals – some of which included behavior changes related to food choices, exercise activity, and stress management. This description of goal attainment strategies used in this study is similar to Blair's (1995) descriptions of using a combination of mutual goal setting and behavior modification to facilitate client outcomes. The same process was used in this study but the outcomes measured were different. Weekly goals provided direction for the subjects and a means to measure behavioral changes toward healthy weight loss.

#### Weight Loss

The investigator compared aspects of this study to similar findings reported in the six weight loss studies of Chapter III. The comparisons included relevance to the research hypothesis and anecdotal reports from subjects.

Levy (1993) surveyed adults trying to lose weight and found that respondents spent an average of six months trying to lose weight and had recurrent weight loss attempts. Two of the 14 subjects in this study entered Phase I three times and seven of the 14 subjects entered Phase I twice. The most prevalent types of weight loss practice as revealed in anecdotal reports by subjects in this study included diet and exercise, use of

vitamins and minerals, use of meal replacements, use of weight loss pills, formal weight loss programs, fasting and taking laxatives -- were also used by subjects in Levy's (1993) study. Peter (1996) revealed similar diet practices noted by subjects.

Bennett (1991) used the Behavioral Risk Factor Surveillance System to assess differences in weight loss practices of overweight adults by sex and race. This study did not differentiate subjects by sex and race. Kramer (1989) explored long-term weight loss outcomes. This study did not explore long-term weight loss stability due to its short duration of eight weeks. Therefore, the investigator was unable to compare the findings to Kramer's, et al. (1989) study.

Skender, et al. (1996) conducted a study of overweight men and women on the effects of three cognitive- behavioral control interventions for adults. They included diet only, exercise only, and a combination of diet and exercise. Skender, et al. (1996) indicated the need for future research into the factors besides diet and exercise influencing weight loss and maintenance. This investigator agrees with Skender's assertion and findings strongly supported the need for further research. In this study, three subjects required an exercise and diet combination focus only. Eleven subjects required a combination of diet, exercise, and attention to personal concerns.

In summary, the author compared anecdotal reports, assessment data from client histories, descriptive data from subjects' participation in nurse case manager intervention activities, and the three hypotheses to the weight loss literature. Variation in study duration, gender and race differentiation, weight loss interventions, and study designs

affected accurate comparisons to the literature. Hypothesis number one and number two were difficult to compare because literature studies did not use case management as an intervention for weight loss. Hypothesis number three on goal attainment did not support reported results in the literature findings.

#### Explanation of Results

There were no significant differences between the nurse case managed group and the services as usual group for weight loss, body fat loss, or goal attainment. The investigator posits several reasons for these findings.

First, there were missing data. The sample size was 38 at the start of the study. The investigator worked with 38 subjects for two months, but only 26 returned for final measurements. Anecdotal reports from subjects who called and dropped from the study indicated weight gain as a reason for failing to complete the study. These missing data may have affected the statistical findings.

Second, there may have been cross-contamination between groups. Several subjects worked in the same Air Force organization but were assigned to different study groups. Conversations may have occurred regarding weight loss plans of the nurse case managed subjects. Subjects from both groups also shared the base fitness facilities.

Third, subjects from both groups were mandated to comply with adherence to Air Force weight standards. Even nurse case managed subjects set weight loss goals based on the minimum monthly criteria rather than goals based upon personal desires. The motivation to lose weight may have been strong in both groups due to the consequences

for failure to lose the weight. These consequences are negative personnel actions and discharge from the military. Perhaps the process of weight loss may have been healthier, more consistent, and more satisfying for the nurse case managed group, in which there was significant weight loss.

Fourth, the process of participating in the services as usual with NCM may have been different from the process of services as usual only, but this was not measured explicitly. The investigator was not informed of the actual weight loss practices of the services as usual group. These practices may have been similar to weight loss practices of the nurse case managed group. Also, services as usual subjects may have participated in weight loss practices using diet medication for rapid weight loss, diuretics, or starvation.

Fifth, the time of nurse case manager and subject involvement in the intervention was brief. Eight weeks may not have been long enough to demonstrate a significant difference in weight loss or weight maintenance. If the assigned intervention had been longer, there might have been more of a difference between the two groups.

#### **Implications For Nursing**

The results of this study are most useful for nurse case managers, health care providers working with weight loss clients, and military health care providers. There has been research done on weight loss practices, but none has used nurse case management as an intervention for promoting weight loss practices. Research on the process of nurse case management is scarce. Studies conducted to examine the process of case management may help improve the strategies case managers use to provide patient care. Military health

providers are challenged by unique circumstances involved in caring for the military member. To best serve the overweight military population, information is needed to determine the most appropriate health professional to provide a holistic way to facilitate weight loss.

On the basis of this study, nurse case management may be the process by which comprehensive assessment, planning, implementation, monitoring, and evaluation provides assistance to overweight military members. A nurse case manager can devise individualized plans, using goal setting strategies, to assist members with their weight loss efforts. A nurse case manager has the ability to coordinate services and resources to help an overweight member achieve weight loss goals. The Air Force Weight Management Program does not address individual needs of the overweight member. Weight loss concerns such as nutrition, exercise, stress management, physical limitations, and other personal lifestyle issues are not addressed in the current program. A single medical evaluation and nutritional consult is not always enough to effect a change in weight loss status.

Findings of this study indicate there was no significant difference in the amount of weight loss in military members working with a nurse case manager as compared to military members who did not. The weekly appointments, timely referrals to other health care providers, weight loss education, and consistent monitoring and evaluation facilitated accomplishment of weight loss goals. It is important for the Air Force to realize the need for individualized weight loss plans for overweight members. Both subsamples

demonstrated a significant change in body fat loss. It is conceivable to question the relationship of weight loss measured in pounds to body fat loss.

In this study, it was also found that there was no significant relationship of goal attainment to nurse case managed subjects compared to services as usual subjects.

However, military members of both groups were concerned only with the military's minimum weight loss requirement. This minimum weight loss goal setting may be an indication of the motivation members have for losing weight. The motivation may not be based upon personal goals, but career-saving goals.

This study did not address the efficacy of the Air Force Weight Management Program proper. The study was designed to be conducted within the framework of current WMP guidelines. Research in the area of evaluating weight loss aspects as well as administrative consequences of the WMP program is needed. Military health providers should address identification of weight status as it relates to job performance.

#### Limitations of the Study

This study was most limited by its lack of generalizability to the overweight population apart from the military. The nurse case management intervention took place in a setting unique to the military. Military interruptions such as job requirements and involvement in activities not authorized by immediate supervisors limited the efficiency of the intervention. The use of a stopwatch to record time spent in each component of the nurse case management process may have distracted the subjects during weekly appointments. A small sample size was also a limitation. The inability to ensure final

measurements of all subjects affected final data. Another limitation may have been the use of predetermined WMP standards rather than personal standards to guide efforts toward weight loss. A final study limitation existed in the length of the study. Weight status change requires time. Eight weeks may not have been enough time to adequately predict weight loss, body fat loss, or goal attainment.

#### Recommendations for Future Research

There has been a gap in the literature pertaining to use of nurse case managers intervening in weight loss practices of overweight adults. There is also a gap in the literature pertinent to use of goal attainment strategies for nurse case management interventions. There has been no research on the weight loss aspects of the Air Force Weight Management Program. Further research on these three areas needs to be conducted.

Replication of this study with a civilian sample could address time spent in nurse case management processes in other overweight populations to assist in identifying NCM components that impact client outcomes. Other studies could investigate the categorizing of nursing activities into case management processes. Qualitative research using a phenomenological approach could describe the lived experiences of people attempting to lose weight, which could yield data on other aspects of a person's life that affect achievement of weight loss goals.

### Summary

Chapter V presented the results of the study related to the conceptual framework and to the literature. The conceptual framework for goal attainment fit well as a guide for the nurse case management intervention. Use of goal attainment strategies supported literature related to goal attainment in nursing. The implications for nursing, limitations, and recommendations for further research were also presented.

**APPENDIX A**

**UNITED STATES AIR FORCE INSTRUCTION 40-502.**

*BY ORDER OF THE  
SECRETARY OF THE AIR FORCE*

*AIR FORCE  
INSTRUCTION 40-502  
7 NOVEMBER 1994*

*Medical Command*

*THE WEIGHT MANAGEMENT PROGRAM*

This instruction establishes how to administer the weight management program, measure body fat, update the personnel data system, and destroy weight management program documents. This instruction applies to all active duty Air Force, Air National Guard members who are under provisions of Title 10, United States Code, and the Air Force Reserve. It implements Air Force Policy Directive (AFPD) 40-5, *Fitness and Weight Management*, and requires collecting and maintaining information protected by the Privacy Act of 1974. The authority to collect and maintain the records prescribed by this instruction derives from Title 10, United States Code, Section 8013. The System of Records Notice F03 5 AF MP N, *Individual Weight Management File*, applies to this instruction. Refer to attachment I for the glossary. Process supplements that affect any military personnel function as shown in Air Force Instruction (AFI) 37-160, volume 1, table 3.2, *The Air Force Publications and Forms Management Programs-Developing and Processing Publications* (formerly Air Force Regulation (AFR) 5-8).

*\*SUMMARY OF CHANGES*

\*This revision defines who may measure individuals for body fat.

Paragraph

*Section A-Program Responsibilities*

Installation Commander 1

Unit Commander 2

Unit WMP Manager 3

Supervisor 4

Chief, Military Personnel Flight (MPF) 5

Geographically Separated Unit (GSU) Commanders 6

*Section B-Program Elements*

The Air Force Body Fat Standard ..... 7

When to Measure an Individual ..... 8

Weight Status Codes (WSC) ..... 9

Processing Body Fat Standard Adjustments ..... 10

When to Conduct Weight Checks, Body Fat Measurements, and Height Measurement ..... 11

*Section C- Weight Management Program Phases*

Assessment Period	12
Phase I (Initial Entry and Body Fat Loss Period) .....	13
Phase II (Observation Period) .....	14
Probation Period .....	15
Reentering the WMP .....	16
Participating in a 90-day Exercise Program .....	17
Processing Medical Deferrals.....	18
Administrative Actions .....	19

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 (Col Joseph W. Moran)  
 OPR: HQ AFMPC/DPMAJB I (MSgt Charles Paul) Pages: 12/Distribution: F

*AFI40-502 7 November 1994*

**Paragraph**

*Section D-Documenting the WMP*

AF Form 108, Weight Program Processing	20
AF Form 393, Individual Record for Weight Management and Fitness Improvement Training (FIT) Programs	21
Weight Management Program Case File (WMPCF)	22

*Forms Prescribed*

AF 108, Weight Program Processing	2.7
AF 393, Individual Record for Weight Management and Fitness Improvement Training (FIT) Programs.	

*\*Visual Aid (VA) Prescribed*

AFVA 40-503, Maximum Allowable Weight Table	
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*Table*

1. Guide for Administrative Actions for the WMP
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*Attachments*

1. Glossary of References, Abbreviations, and Terms
2. Measuring Body Fat
3. Weight Management Program Overview
4. Performing Weight Checks and Height Measurements

### ***Section A-Program Responsibilities***

**1. Installation Commander:**

- 1. Manages the WMP and serves as the **final** authority for matters concerning the WMP.
- 1.2. Grants individual exemptions for WMP participation.
- 1.3. Obtains recommendations on how to improve the WMP from the Director of **Base Medical Services (DBMS)** and the unit commander.

**2. Unit Commander:**

- 2. Administers the WMP.
- 2.2. Once a month but on an irregular schedule, conducts random weigh-ins. Keeps records to ensure that all personnel get weighed or measured at least once a year. \*2.3. Measures the body fat percentage of any individual who exceeds their maximum allowable weight, appears to exceed the body fat standard, or who doesn't present a professional military appearance, or whenever appropriate. \*2.4. Appoints a WMP manager, or one manager and an assistant of the opposite sex so that all personnel are measured for body fat by an individual of the same sex. 2.5. Organizes individual and unit sports, fitness, and recreational activities.
- 2.6. Encourages personnel to follow an active conditioning program and a proper diet regimen.
- 2.7. Notifies the Military Personnel Flight (MPF), Special Actions, when individuals enter and leave the WMP or undergo a change of status at non -PC-111 configured units. Use AF Form 108, **Weight Program Processing**.

Atch 4

2.8. At PC-111 units, updates the appropriate Weight Status Code (WSC) reflected on AF Form 108 into the Personnel Data System (PDS).

2.9. Mails the WMP Case File (WMPCF) to the gaining commander within 5 duty days after an individual departs on Permanent Change of Station (PCS) or Permanent Change of Assignment (PCA). 2.10. Reschedules the weigh-in dates of female personnel, based on their menstrual cycles.

3. **Unit WMP Manager:** Monitors individuals enrolled in the WMP.

4. **Supervisor:** Supports the WMP and gives motivational-counseling to subordinates.

5. **Chief, MPF.** Provides procedural guidance on the WMP. Updates the PDS and provides copies of body fat percentage charts for non PC-111 units.

6. **Geographically Separated Unit (GSU) Commanders-**

: Delays or waives the program requirements if limited facilities, equipment, or geographical location and conditions prevent people from completing all aspects of the WMP. Document any delay or waiver on AF Form 393, **Individual Record for Weight Management and Fitness Improvement Training Programs**.

### ***Section B-Program Elements***

*AF140-502 7 November 1994*

7. The Air Force Body Fat Standard. These are the Air Force's maximum body fat standards:

- \* 20 percent for men 29 years old and younger.
- \* 24 percent for men 30 years old and older.
- \* 28 percent for women 29 years old and younger.
- 32 percent for women 30 years old and older.

8. When to Measure an Individual. The WMP manager must measure anybody who:

- Exceeds the height-to-weight charts for body fat percentage. Use the circumferential measurement technique described in attachment 2.
- According to the unit commander, appears to exceed body fat standards or doesn't present a professional military appearance.

9. Weight Status Codes (WSC). The unit commander and WMP manager use the following WSCs to track which phase of the WMP an individual is currently in:

- WSC 1 - Satisfactory Progress (phase 1)
- WSC 2 - Unsatisfactory Progress (phase 1)
- WSC 3 - 6-Month Observation Period (phase 2)
- WSC 4 - Body Fat Standard Adjustment
- WSC 5 - Temporary Medical Deferral (phase 1)
- WSC 6 - Initial Entry (phase 1)
- WSC 7 - 1-Year Probation Period

10. Processing Body Fat Standard Adjustments. The unit commander considers an individual for an upward body fat standard adjustment if they are over the body fat limits according to the body fat percent charts in PC-111 but otherwise appear physically fit. Only increases to the body fat percentage will be considered.

10.1. To assess whether an individual should receive a body fat standard adjustment, the unit commander:

- Refers the individual to DBMS for a medical evaluation to determine if a body fat standard adjustment is appropriate.
- Sends the recommendation and the results of the DBMS evaluation to the installation commander for consideration.

10.2. Installation commanders approve upward body fat standard adjustments for 6-month periods only. Individuals must submit for a reevaluation before the commander renews the request. 10.3. The WMP manager updates these PDS codes for individuals who receive approved body fat standard adjustments:

- WSC 4 for individuals not entered in the WMP.
- WSC 3 for individuals currently in Phase I of the WMP.

10.4. If the installation commander revokes a body fat standard adjustment, the unit commander allows individuals sufficient time to reduce their body fat percentage at the rate of 1 percent of body fat per month before determining entry into WSC 1 or 3.

10.4. 1. Individuals who can't meet their body fat standard in the unit commanders designated time frame must enter into WSC 1.

\*1 1. When to Conduct Weight Checks, Body Fat Measurements, and Height Measurements. Weigh or measure individuals at least once a year and before these changes in status:

I 1. 1. Promotions and Appointments. Weigh or measure before processing individuals for promotion, Regular Air Force (RegAF) appointments, Conditional Reserve Status (CRS), and before selecting officers for selective continuation.

\* 1 1.2. PCS. Weigh or measure individuals no earlier than (NET) 30 and no later than 10 calendar days before departure.

1 1.3. PCA. The losing and gaining unit commander make sure that members don't have to interrupt their WMP activities.

11.4. Temporary Duty (TDY). The unit commander decides whether a member qualifies for command-support or normal-mission TDY. The individual carries a copy of their WMP to the TDY unit commander, when appropriate.

1 1.4. 1. When the TDY is 29 days or more, the TDY commander enters members who exceed the body fat standards in the WMP and monitors their progress. \* 1 1.4.2. TDY for Professional Military Education (PME), retraining, or a training course (formal, specialization, or qualification training). Weigh or measure individuals NET 30 and no later than 10 calendar days prior to the projected departure date.

1 1.4.2. 1. Individuals in Phase I are ineligible to attend PME.

\* 1 1.5. Reenlistments. Weigh or measure an individual when initially identified and again NET 30 and no later than 10 workdays prior to reenlistment.

11.5.1 Individuals in Phase I cannot reenlist. The unit commander determines reenlistment eligibility during the individual's entire WMP participation period.

#### *Section C-Weight Management Program Phases*

12. Assessment Period. The WMP manager ensures that all overfat individuals get medically cleared and receive diet counseling before entering the WMP.

12. 1. The DBMS determines whether individuals can safely and feasibly reduce weight or body fat, and be entered into a 90-day exercise program.

13. Phase I (Initial Entry and Body Fat Loss Period).

13.1. The unit commander:

- Places individuals in Phase I of the WMP when their body fat percentage exceeds Air Force standards.
- Informs individuals that they must remain in Phase I until meeting the body fat standard or getting approval for a body fat standard adjustment.

*AFI40-502 7 November 1994*

Ensures that individuals receive a medical examination, get initial and quarterly diet counseling and enter a 90-day exercise program.

13.2. The WMP manager:

- Measures all Phase I participants upon initial entry and on a monthly basis to determine their progress.
- Uses AF Form 393 to record medical clearances, diet counseling sessions, weight and body fat measurements, and administrative actions.
- Uses AF Form 108 each time a change in status occurs which requires update of a different WSC.
- Updates WSC I for individuals making satisfactory progress.
- Updates WSC 2 for individuals making unsatisfactory progress.
- Gives a copy of the WMP overview to each participant. (See attachment 3.)

14. Phase II (Observation Period),

14. 1. The unit commander enters individuals into Phase 11

who:

- Successfully complete Phase 1.
- Meet body fat standards during the DBMS evaluation after being identified as overfat.

14.2. The WMP manager:

- Measures participants monthly.
- Keeps participants in WSC 3 for a 6-month period when the commander approves a medical deferral.
- Update participants to WSC 7 after 6 months, if appropriate.

15. Probation Period. Unit commanders use the probation period to ensure that individuals who successfully complete Phase 11 remain committed to stay at or below their maximum body fat percentage for a 1-year period.

15. 1. Unit commanders may weigh or measure individuals at any time during this 12-month probation period. 15.2. Individuals who receive a commander-approved medical deferral during the probation period remain in WSC 7.

16. Reentering the WMP.

16. 1. The unit commander reenters individuals in Phase I any time they exceed body fat standards while in Phase 11 or the probation period.

16.2. Individuals who reenter Phase I must remain in WSC 2 for a minimum of 1 month.

16.3. Individuals who reenter Phase I must progress through Phase 11 and the probation period again.

17. Participating in a 90-day Exercise Program.

17. 1. Individuals who enter Phase I or enter directly into Phase 11 must participate in a 90-day exercise program.

17.2. The unit commander:

- \* May require that individuals who don't present a professional military appearance enter a 90-day exercise program, regardless of weight or body fat percentage.
- Must direct individuals to get a medical clearance before entering the exercise program.
- Must specify, in writing, the date when individuals should complete the program and the requirements that they must meet.
- May extend the exercise program beyond the 90 days until participants achieve a professional military appearance.
- May allow individuals to exercise during duty hours, if appropriate.

18. Processing Medical Deferrals. Unit commanders may approve a temporary medical deferral for Phase I participants, when recommended by a medical practitioner. Unit commanders may also approve a medical deferral for the 90-day exercise program.

18. 1. Unit commanders notify the individuals who get deferrals that they remain ineligible for many career related events (see paragraph I 1).

18. 1. 1. For medical deferrals from Phase 1: The WMP manager updates the PDS to WSC 5. Don't measure these individuals until the deferral expires.

18.1.2. For medical deferrals from the 90-day exercise program: The WMP manager keeps the individual in WSC 1 or 2 and takes monthly weight and body fat measurements.

18.2. For medical deferrals due to pregnancy: The WMP manager updates the PDS to WSC 5. This deferral expires 6 months after the pregnancy ends. The unit commander may approve up to 18 months of deferral for pregnancy, based on a medical practitioner's recommendation.

183. In cases other than pregnancy, the unit commander may approve medical deferrals in 6-month increments, not to exceed 12 consecutive months. The unit commander recommends to the installation commander all deferrals exceeding 1 year.

18.4. The WMP manager measures a person after the deferral expires and enters him or her into WSC 1 or 3 using AF Form 108.

19. Administrative Actions. Unit commanders take administrative action when a person doesn't make satisfactory progress (see table 1).

19. 1. If a member fails to make satisfactory progress in the WMP on four occasions, unit commanders must make a recommendation to retain, discharge, or separate that member. If retained, the member gets assessed by the unit commander after each subsequent failure.

19.2. The installation commander makes the final decision to retain, discharge, or separate members who fail more than four times to satisfactorily lose the required monthly loss of weight or body fat while participating in the WMP.

*AF140-502 7 November 1994*

19.3. Failing to make satisfactory progress in the WMP doesn't by itself constitute a violation of the Uniform Code of Military Justice (UCMJ). Unit commanders may not impose non judicial punishment on members solely for exceeding body fat standards or failing to meet monthly loss requirements.

*Section D-Documenting the WMP*

## 20. AF Form 108. The unit commander or WMP

manager uses AF Form 108 to document an individual's date of entry, medical information, dietary information, WSC changes, temporary medical deferral from Phase 1, approval or disapproval for an adjusted body fat standard, continuation in a 90-day exercise program, and reenlistment eligibility. The WSC change is effective on the date that the member acknowledges the action.

20. 1. The Vice Commandant of the College of Enlisted PME and NCOs assigned duty as Detachment Chief or

Academy Commandant have signature authority for the AF Form 108.

21. AF Form 393. The WMP manager uses AF Form 393 to document an individual's status, progress, and administrative actions given while in the WMP. 21.1. File a copy of the form in the transitory file when the individual departs PCS or PCA.

22. Weight Management Program Case File (WMPCF). The WMP manager files the AF Forms 108 and 393, records of administrative actions, and any other pertinent documents in the WMPCF.

22. 1. The unit commander or WMP manager destroys the member's WMPCF when the probation period ends or after the member's separation or retirement.

Table 1. Guide For Administrative Actions For The WMP. (See Note 1.)

Unsatisfactory Period

Options for Enlisted

Options for Officers

Verbal Counseling

Letter of Admonition

Verbal Reprimand

Letter of Reprimand

Establish UIF

Limit Supervisory Responsibilities

Remove Supervisory Responsibilities

Performance Report Comments on

Unsatisfactory Progress

Prepare a "Directed by Commander"

Report for Unsatisfactory Progress

Promotion Propriety Action

Control Roster

Administrative Demotion

Administrative Separation (note 2)

Retention with continuation in WMP and  
appropriate administrative actions from  
Third Unsatisfactory List

*NOTES.*

1. This figure provides the normal sequence and timing of administrative actions. Unit commanders take progressively more severe administrative actions, based on the number of unsatisfactory progress periods. Use one or more of the actions

*AF140-502 7 November 1994*

from the appropriate columns at each step. Don't use the same administrative action consecutively more than two times (except for OPR/EPR comments, which you may use at any point and as often as necessary). Unsatisfactory periods don't need to be consecutive for administrative actions.

2. The unit commander follows the procedures contained in AM 36-3206, *Administrative Discharge Procedures (formerly AFR36-2) for officers* and AF136-3208, *Administrative Separation of Airmen (formerly AFR39-IO) for airmen*. Unit commanders exercise their prerogative when selecting actions from each unsatisfactory listing to document a member's lack of progress in the WMP. After making the decision whether to retain or separate the individual, notify the installation commander, in writing, and specify if this is the fourth or subsequent unsatisfactory progress period. For an officer, send the recommendation for discharge or retention to the initiating commander in accordance with AM 36-3206.

BILLY J. BOLES, Lt General, USAF  
DCS/Personnel

*AF140-502 Attachment] 7 November 1994*

GLOSSARY OF REFERENCES, ABBREVIATIONS AND TERMS

*Section A-References*

Article 15 UCMJ

DoD Directive 1308.1, 29 June 1981

Public Law 93-579

System of Records Notice F035 AF MP N

Title 5, United States Code, Section 552a

Title 10. United States Code, Section 8013

*Section B-Abbreviations*

*Abbreviations      Definitions*

AFPD	Air Force Policy Directive
BFM	Body Fat Measurement
CRS	Conditional Reserve Status
DBMS	Director of Base Medical Services
DP	Director of Personnel
GSU	Geographically Separated Unit
MPF	Military Personnel Flight
NET	No Earlier Than
PCA	Permanent Change of Assignment
<b>PCS</b>	Permanent Change of Station
PDS	Personnel Data System
PME	Professional Military Education
RegAF	Regular Air Force
TDY	Temporary Duty
UCMJ	Uniform Code of Military Justice
WMP	Weight Management Program
WMPCF	Weight Management Program Case File
WSC	Weight Status Code

*Section C- Terms*

*Body Fat Measurement (BFM)-*Determining an individual's body fat percentage by using circumferential measurement technique as outlined in attachment 2.

*Body Fat Percentage-*The weight of the fat in an individual's body as a percentage of total body weight.

*Monthly-*A calendar month or the period of time from any day of one month to the corresponding day of the next month. Periods of approximately 30 days.

*90-Day Exercise Program-*A specifically designed conditioning and dietary program for members in the WMP. Combine this program with the FIT program if the individual is aerobically unfit as well as overfat.

*Observation Period (Weight Management Program (WMP) Phase 11)-*A 6-month period after the member has met the body fat standards, during which the member continues monthly body fat measurements to monitor fitness and dietary habits. Weight Status Code (WSC) 3.

*AF140-502 Attachment 7 November 1994 7 Overfat-*Body fat percentage exceeds the standards prescribed in paragraph 7.

*Personnel Data System (PDS)-*A collective term encompassing the total vertical computerized personnel data system. Use it when you're not referencing a specific subsystem.

*Physical Fitness-*The ability to rapidly transform stored energy into work. The ability to do daily tasks efficiently, without undue fatigue, and have ample energy remaining for military contingencies, emergencies, and leisure pursuits.

*Physical Profile Serial Report (AF Form 422)-As specified in AFI 48-1233, Medical Examination and Medical Standards (formerly AFR 160-43), use this AF form for communicating information from a medical facility to personnel, command, and training authorities. The form describes the examinee's condition in non technical terms, and records duty restrictions and assignment limitations.*

*Probation Period-A mandatory 1-year period following completion of the WMP's Phase II.*

*Satisfactory Progress-A change in body fat composition or weight as specified in AFPD 40-5 that results in a decrease of at least 1 percent in body fat per month or a weight loss of 3 pounds per month for women or 5 pounds per month for men. PDS code: WSC 1.*

*Temporary Medical Deferral-A temporary deferral from Phase I of the WMP or 90-day exercise program for documented medical reasons. A medical practitioner and the unit commander must approve the deferral. With the exception of pregnancy deferrals, approved and revalidated deferrals by the unit commander must not exceed increments of 6 months. PDS code: WSC 5 for Phase I deferral only.*

*Unit Weight Program Manager-An individual selected by the unit commander to assist and advise the unit commander in conducting the WMP.*

*Unsatisfactory Progress-Failure to reduce body fat or weight at the rates described for satisfactory progress while in Phase I or an increase in body fat resulting in an individual's exceeding body fat standards while in Phase II or the probation period. PDS code: WSC 2.*

*Weight Management Program (WMP)-A rehabilitative program designed to assist overfat individuals in meeting Air Force body fat standards. It also monitors individuals for 18 months after meeting body fat standards to reinforce long-term fitness and dietary changes.*

*Weight Status Codes (WSC-The PDS codes identify an individual's current status in the WMP.*

*AF140-502 Attachment 2 7 November 1994*

#### MEASURING BODY FAT

A2.1. How to Measure. To record an individual's body fat percentage, first measure the individual's height, rounding up to nearest half inch (see attachment 4). Use a standard, non-stretching (metal, cloth or fiberglass) tape measure that has sufficient tension to remain in place without indenting the skin. With exception of women's buttocks measurement, take all measurements on bare skin. Take buttocks measurements while the woman is wearing nonrestrictive gym shorts. Don't measure individuals wearing skin-tight, lycra or spandex garments.

A2.2. Procedures for Measuring the Neck. With the individual looking straight ahead and shoulders down (not hunched), measure the neck circumference at a point below the larynx (Adam's apple) with the tape sloping slightly downward to the front. Due to the shape of the neck (spinal column), expect the tape to incline down toward the front (similar

to the shirt collar line). Round neck measurements up to the nearest quarter inch.

#### A2.3. Procedures for Measuring Women.

- With the individual standing with arms at her sides and at the end of a normal relaxed exhalation, measure the natural waist circumference. The natural waist circumference is the narrowest point, usually located about half way between the naval and the lower end of the sternum (breast bone). When it is not easy to distinguish the narrowest point, take several measurements and use the smallest. Round the waist measurements down to the nearest quarter inch.
- While facing the individual's right side, and with the tape level to the floor, measure the buttocks circumference by placing the tape so it passes over the gluteal muscle (buttocks) at the point that protrudes the farthest. Apply the tape with sufficient tension to limit the effect of clothing. Round the buttocks measurements down to the nearest quarter inch.

Determine the individual's body fat percentage by adding the waist and buttocks measurements then subtracting the neck measurement from the sum. Use the menu in PC-111 and compare this value to the individual's height measurement.

#### A2.4. Procedures for Measuring Men.

With the individual standing with arms at his sides and at the end of a normal relaxed exhalation, measure the abdominal circumference at the navel while keeping the tape level to the floor. Round abdominal measurements down to the nearest quarter inch.

\*e Determine the individual's body fat percentage by subtracting the neck measurement from the abdominal measurement.

Use the menu in PC-111 and compare this value to the individual's height measurement.

*A, @J 40-502 Attachment 3 7 November 1994*

#### WEIGHT MANAGEMENT PROGRAM OVERVIEW

Entry into WMP occurs when you exceed Air Force body fat standards

Entry requires medical evaluation, diet counseling, and a body fat measurement

--- The Installation Commander may adjust your body fat standard upward based on the recommendation of the unit commander if you exceed your body fat standard but present a professional military appearance. You need a medical evaluation.

Entry into Phase I of WMP results in:

- Ineligible for PCS reassignment if making unsatisfactory progress (unless mandatory move)
- Ineligible to reenlist
- Cannot assume higher grade, if selected (enlisted only)
- Cannot attend PME
- Cannot voluntarily retrain
  - 90-day Exercise Program enrollment (minimum of 90 days)
  - Diet counseling
- Weight and body fat loss evaluated by unit commander or WMP manager monthly
  - Must reduce body fat 1 percent each month or lose 3 pounds (women) or 5 pounds (men) per month
- Unsatisfactory progress occurs when you fail to comply with the above monthly loss requirements or are reentered into Phase I from Phase 11 or Probation Period

Unsatisfactory progress results in

- Administrative action by unit commander
  - Administrative separation is appropriate for repeated unsatisfactory progress
- You progress to the 6-month observation (Phase 11) when you reach your body fat standard
- You may be eligible for PCS reassignment, reenlistment, voluntary retraining, PME; may assume higher grade, if selected (enlisted only)

-- Unit commander has option to deny reenlistment during Phase 11

Your body fat is measured monthly

You should continue diet counseling

At commander's discretion, the 90-day exercise program may be continued

--- If you're entered directly into Phase 11, a 90-day exercise program is mandatory

If you exceed body fat standards during Phase 11, you're reentered into Phase 1, unsatisfactory progress with administrative actions

*AF140-502 Attachment 3  
1994*

*7 November*

When you reach and maintain body fat standards for 6 consecutive months, you're entered in 1-year Probation Period

During Probation Period, WMP data is retained in the PDS for 1 year

Monthly body fat checks and diet counseling not required

If ineligible for reenlistment during Phase 11, unit commander has option to deny reenlistment during probation period

If you exceed body fat standards during the Probation Period, you're reentered into Phase 1, unsatisfactory progress with administrative actions

-- When you maintain body fat standards for 1 year after completion of Phase 11, all WMP data is removed from PDS, and WMPCF is destroyed

*AF140-502 Attachment 3 November 1994*

#### PERFORMING WEIGHT CHECKS AND HEIGHT MEASUREMENTS

A4.1. How to Weigh Individuals. Individuals will be weighed with shoes off, in any military uniform with the contents of pockets emptied, and any extraneous equipment or outer clothing removed. While the individual is standing still read the measurement while standing directly in front or behind the scale, if possible. After 3 pounds is subtracted for clothing, record the weight to the nearest quarter-pound.

\*9 Display the weight table (AFVA 40-503) near the scales.

A4.2. How to Measure for Height. Individuals will be measured with the back to hard surface method. Do not use the traditional "doctor scales". A properly calibrated index, marked off in quarter inch increments will be placed on a firm vertical surface adjoining a hard surface floor (noncarpeted). Take measurements against this index using a device with a true 90-degree angle (for example, a drafting triangle) or a bubble level to ensure accurate measurement.

- Measure individuals with their shoes off. Members must stand facing the person measuring them, making sure their heels are together and the back straight. The individual's line of sight must be horizontal.
- The measuring bar will come to a rest lightly on the crown of the head. Read the measurement directly in front of the bar, not at an angle from the side. Measure the member's height to the nearest quarter-inch for determining the interpolated weight. Round the measurement up to the nearest half inch to determine body fat percentage by charts in PC-111.

Administer the measurement before 1,000 hours. Measure shift workers as early in the shift as reasonably possible.

**APPENDIX B**  
**BODY FAT STANDARDS**

CIRCUMF. VALUE *	HEIGHT (INCHES)									
	58.0	58.5	59.0	59.5	60.0	60.5	61.0	61.5	62.0	62.5
34.5	1	0	0	0	0	0	0	0	0	0
35.0	2	1	1	1	0	0	0	0	0	0
35.5	3	2	2	2	1	1	0	0	0	0
36.0	4	3	3	3	2	2	1	1	1	0
36.5	5	4	4	4	3	3	2	2	2	1
37.0	6	5	5	4	4	4	3	3	3	2
37.5	7	6	6	5	5	5	4	4	4	3
38.0	7	7	6	6	6	6	5	5	5	4
38.5	8	8	8	7	7	7	6	6	5	5
39.0	9	9	9	8	8	7	7	7	6	6
39.5	10	10	9	9	9	8	8	8	7	7
40.0	11	11	10	10	10	9	9	8	8	8
40.5	12	12	11	11	10	10	10	9	9	9
41.0	13	12	12	12	11	11	11	10	10	10
41.5	14	13	13	13	12	12	11	11	11	10
42.0	14	14	14	13	13	13	12	12	12	11
42.5	15	15	15	14	14	13	13	13	12	12
43.0	16	16	15	15	15	14	14	14	13	13
43.5	17	17	16	16	15	15	15	14	14	14
44.0	18	17	17	17	16	16	16	15	15	14
44.5	19	18	18	17	17	17	16	16	16	15
45.0	19	19	19	18	18	17	17	17	16	16
45.5	20	20	19	19	19	18	18	18	17	17
46.0	21	20	20	20	19	19	19	18	18	18
46.5	22	21	21	20	20	20	19	19	19	18
47.0	22	22	22	21	21	20	20	20	19	19
47.5	23	23	22	22	22	21	21	21	20	20
48.0	24	23	23	23	22	22	22	21	21	21
48.5	25	24	24	23	23	23	22	22	22	21
49.0	25	25	25	24	24	23	23	23	22	22
49.5	26	26	25	25	24	24	24	23	23	23
50.0	27	26	26	26	25	25	24	24	24	23
50.5	27	27	27	26	26	26	25	25	24	24
51.0	28	28	27	27	27	26	26	25	25	25
51.5	29	28	28	28	27	27	27	26	26	25
52.0	29	29	29	28	28	28	27	27	27	26
52.5	30	30	29	29	29	28	28	28	27	27
53.0	31	30	30	30	29	29	29	28	28	27
53.5	31	31	31	30	30	30	29	29	28	28
54.0	32	32	31	31	31	30	30	30	29	29
54.5	33	32	32	32	31	31	31	30	30	29
55.0	33	33	33	32	32	32	31	31	30	30
55.5	34	34	33	33	33	32	32	31	31	31
56.0	35	34	34	33	33	33	32	32	32	31
56.5	35	35	34	34	34	33	33	33	32	32
57.0	36	35	35	35	34	34	34	33	33	33
57.5	36	36	36	35	35	35	34	34	34	33
58.0	37	37	36	36	36	35	35	35	34	34
58.5	38	37	37	37	36	36	35	35	34	34

\*\*Body fat standards are 28% for women 29 years and younger; 32% for women 30 years and older.

## PERCENT BODY FAT FOR FEMALES

CIRCUMF. VALUE *	HEIGHT (INCHES)										
	58.0	58.5	59.0	59.5	60.0	60.5	61.0	61.5	62.0	62.5	
59.0	38	38	38	37	37	36	36	36	35	35	
59.5	39	38	38	38	37	37	37	36	36	36	
60.0	39	39	39	38	38	38	37	37	37	36	
60.5	40	40	39	39	39	38	38	37	37	37	
61.0	41	40	40	39	39	39	38	38	38	37	
61.5	41	41	40	40	40	39	39	39	38	37	
62.0	42	41	41	41	40	40	40	39	38	38	
62.5	42	42	42	41	41	40	40	40	39	39	
63.0	43	42	42	42	41	41	41	40	40	40	
63.5	43	43	43	42	42	42	41	41	40	40	
64.0	44	44	43	43	42	42	42	41	41	41	
64.5	45	44	44	43	43	43	42	42	42	41	
65.0	45	45	44	44	44	43	43	42	42	42	
65.5	46	45	45	44	44	44	43	43	42	42	
66.0	46	46	45	45	45	44	44	44	43	43	
66.5	47	46	46	46	45	45	44	44	44	43	
67.0	47	47	46	46	46	45	45	45	44	44	
67.5	48	47	47	47	46	46	45	45	45	44	
68.0	48	47	47	47	47	46	46	46	45	45	
68.5	49	48	48	48	47	47	47	46	46	45	
69.0	49	49	48	48	48	47	47	47	46	45	
69.5	50	49	49	49	48	48	48	47	47	46	
70.0	50	50	49	49	49	48	48	48	47	47	
70.5	51	50	50	50	49	49	49	48	48	47	
71.0	51	51	50	50	50	49	49	49	48	48	
71.5	52	51	51	51	50	50	50	49	49	48	
72.0	52	52	51	51	51	50	50	50	49	49	
72.5	53	52	52	52	51	51	50	50	50	49	
73.0	53	53	52	52	52	51	51	51	50	50	
73.5	54	53	53	53	52	52	51	51	51	50	
74.0	54	54	53	53	53	52	52	52	51	51	
74.5	55	54	54	53	53	53	52	52	52	51	
75.0	55	55	54	54	54	54	53	53	52	52	
75.5	56	55	55	54	54	54	53	53	52	52	

## CIRCUMF.

VALUE *	63.0	63.5	64.0	64.5	65.0	65.5	66.0	66.5	67.0
34.5	0	0	0	0	0	0	0	0	0
35.0	0	0	0	0	0	0	0	0	0
35.5	0	0	0	0	0	0	0	0	0
36.0	0	0	0	0	0	0	0	0	0
36.5	1	1	0	0	0	0	0	0	0
37.0	2	2	1	1	1	0	0	0	0
37.5	3	3	2	2	2	1	1	1	0
38.0	4	3	3	3	2	2	1	1	1
38.5	5	4	4	4	3	3	2	2	2
39.0	6	5	5	5	4	4	3	3	3
39.5	7	6	6	6	5	5	4	4	4
40.0	7	7	7	6	6	6	5	5	5
40.5	8	8	8	7	7	7	6	6	6
41.0	9	9	8	8	8	7	7	7	6
41.5	10	10	9	9	9	8	8	8	7
42.0	11	10	10	10	9	9	9	8	8
42.5	12	11	11	11	10	10	10	9	9
43.0	12	12	12	11	11	11	10	10	10
43.5	13	13	13	12	12	12	11	11	11
44.0	14	14	13	13	13	12	12	12	11
44.5	15	15	14	14	14	13	13	13	12
45.0	16	15	15	15	14	14	14	13	13
45.5	16	16	16	15	15	15	14	13	13
46.0	17	17	17	16	16	16	15	14	14
46.5	18	18	17	17	17	16	16	15	15
47.0	19	18	18	18	17	17	17	16	15
47.5	19	19	19	18	18	18	17	16	16
48.0	20	20	20	19	19	18	17	17	17
48.5	21	21	20	20	20	19	18	18	18
49.0	22	21	21	21	20	20	19	19	18
49.5	22	22	22	21	20	20	20	19	19
50.0	23	23	22	22	21	21	20	20	20
50.5	24	23	23	23	22	22	21	21	20
51.0	24	24	24	23	23	23	22	21	21
51.5	25	25	24	24	24	23	22	22	22
52.0	26	25	25	25	24	23	23	23	22
52.5	26	26	26	25	25	25	24	23	23
53.0	27	27	26	26	26	25	25	24	24
53.5	28	27	27	27	26	26	26	25	25
54.0	28	28	28	27	27	27	26	26	26
54.5	29	29	28	28	28	27	27	27	26
55.0	30	29	29	29	28	28	28	27	27
55.5	30	30	30	29	29	29	28	28	28
56.0	31	31	30	30	30	29	29	29	29
56.5	32	31	31	31	30	30	30	29	29
57.0	32	32	32	31	31	31	30	30	30
57.5	33	32	32	32	31	31	31	30	30
58.0	33	33	33	32	32	32	31	31	31
58.5	34	34	33	33	33	32	32	31	31

## CIRCUMF.

VALUE *	68.0	68.5	69.0	69.5	70.0	70.5	71.0	71.5	72.0
34.5	0	0	0	0	0	0	0	0	0
35.0	0	0	0	0	0	0	0	0	0
35.5	0	0	0	0	0	0	0	0	0
36.0	0	0	0	0	0	0	0	0	0
36.5	0	0	0	0	0	0	0	0	0
37.0	0	0	0	0	0	0	0	0	0
37.5	0	0	0	0	0	0	0	0	0
38.0	0	0	0	0	0	0	0	0	0
38.5	1	1	1	0	0	0	0	0	0
39.0	2	2	2	1	1	1	0	0	0
39.5	3	3	3	2	2	2	1	1	1
40.0	4	4	3	3	3	3	2	2	2
40.5	5	5	4	4	4	3	3	3	3
41.0	6	5	5	5	5	4	4	4	4
41.5	7	6	6	6	5	5	4	4	4
42.0	8	7	7	7	6	6	6	5	5
42.5	8	8	8	7	7	7	6	6	6
43.0	9	9	9	8	8	8	7	7	7
43.5	10	10	9	9	9	8	8	8	7
44.0	11	10	10	10	9	9	9	9	8
44.5	12	11	11	11	10	10	10	9	9
45.0	12	12	12	11	11	11	10	10	10
45.5	13	13	12	12	12	12	11	11	11
46.0	14	14	13	13	13	12	12	12	11
46.5	15	14	14	14	13	13	13	12	12
47.0	15	15	15	14	14	14	13	13	13
47.5	16	16	15	15	15	15	14	14	14
48.0	17	17	16	16	16	15	15	15	14
48.5	18	17	17	17	16	16	16	15	15
49.0	18	18	18	17	17	17	16	16	16
49.5	19	19	18	18	18	17	17	17	17
50.0	20	19	19	19	18	18	18	18	17
50.5	20	20	20	19	19	19	19	18	18
51.0	21	21	20	20	20	20	19	19	19
51.5	22	21	21	21	21	20	20	20	19
52.0	22	22	22	22	21	21	21	20	20
52.5	23	23	22	22	22	22	21	21	21
53.0	24	23	23	23	23	22	22	22	21
53.5	24	24	24	23	23	23	23	22	22
54.0	25	25	24	24	24	24	23	23	23
54.5	26	25	25	25	24	24	24	24	23
55.0	26	26	26	25	25	25	24	24	24
55.5	27	27	26	26	26	25	25	25	25
56.0	28	27	27	27	26	26	26	25	25
56.5	28	28	28	27	27	27	26	26	26
57.0	29	29	28	28	28	27	27	27	26
57.5	30	29	29	29	28	28	28	27	27
58.0	30	30	29	29	29	29	28	28	28
58.5	31	30	30	30	29	29	29	29	28

## PERCENT BODY FAT FOR FEMALES

CIRCUMF. VALUE *	HEIGHT (INCHES)										
	63.0	63.5	64.0	64.5	65.0	65.5	66.0	66.5	67.0	67.5	
59.0	35	34	34	34	33	33	33	32	32	32	
59.5	35	35	35	34	34	34	33	33	33	32	
60.0	36	35	35	35	34	34	34	33	33	32	
60.5	36	36	36	35	35	35	34	34	33	33	
61.0	37	37	36	36	36	35	35	34	34	33	
61.5	38	37	37	37	36	36	36	35	34	34	
62.0	38	38	37	37	37	36	36	35	35	35	
62.5	39	38	38	38	37	36	36	36	35	35	
63.0	39	39	39	38	37	37	37	36	36	36	
63.5	40	39	39	39	38	38	37	37	37	36	
64.0	40	40	40	39	39	38	38	37	37	37	
64.5	41	41	40	40	40	39	38	38	38	37	
65.0	41	41	41	40	40	39	39	39	38	38	
65.5	42	42	41	41	41	40	40	39	39	38	
66.0	43	42	42	41	41	41	40	40	39	39	
66.5	43	43	42	42	42	41	41	40	40	39	
67.0	44	43	43	42	42	42	42	41	40	40	
67.5	44	44	43	43	43	42	42	42	41	41	
68.0	45	44	44	44	43	43	43	42	42	41	
68.5	45	45	44	44	44	43	43	42	42	42	
69.0	46	45	45	45	44	44	44	43	43	43	
69.5	46	46	45	45	45	44	44	44	43	43	
70.0	47	46	46	46	45	45	45	44	44	44	
70.5	47	47	46	46	46	45	45	45	44	44	
71.0	48	47	47	47	46	46	46	45	45	45	
71.5	48	48	47	47	47	46	46	45	45	45	
72.0	49	48	48	48	47	47	46	46	45	45	
72.5	49	49	48	48	48	47	47	46	46	46	
73.0	50	49	49	49	48	47	47	47	46	46	
73.5	50	50	49	49	49	48	48	47	47	47	
74.0	51	50	50	49	49	48	48	48	47	47	
74.5	51	51	50	50	50	49	48	48	47	47	
75.0	51	51	51	50	50	50	49	49	48	48	
75.5	52	52	51	51	51	50	50	49	49	48	

## PERCENT BODY FAT FOR FEMALES

CIRCUMF. VALUE *	HEIGHT (INCHES)										
	68.0	68.5	69.0	69.5	70.0	70.5	71.0	71.5	72.0	72.5	
59.0	31	31	31	30	30	30	29	29	29	28	
59.5	32	32	31	31	31	30	30	30	29	29	
60.0	32	32	32	32	31	31	31	30	30	30	
60.5	33	33	32	32	32	31	31	31	31	30	
61.0	33	33	33	33	32	32	32	31	31	31	
61.5	34	34	34	33	33	33	32	32	32	31	
62.0	35	34	34	34	34	33	33	33	32	32	
62.5	35	35	35	34	34	34	33	33	33	33	
63.0	36	36	35	35	35	34	34	34	33	33	
63.5	36	36	36	35	35	35	34	34	34	34	
64.0	37	37	36	36	36	35	35	34	34	34	
64.5	38	37	37	37	36	36	36	35	35	34	
65.0	38	38	37	37	37	37	36	36	35	35	
65.5	39	38	38	38	37	37	37	36	36	35	
66.0	39	39	39	38	38	38	37	37	37	36	
66.5	40	39	39	39	38	38	37	37	37	36	
67.0	40	40	40	39	39	39	38	38	38	37	
67.5	41	40	40	40	39	39	39	39	38	38	
68.0	41	41	41	40	40	40	39	39	39	38	
68.5	42	41	41	41	40	40	40	40	39	39	
69.0	42	42	42	41	41	41	40	40	40	39	
69.5	43	42	42	42	42	42	41	41	40	40	
70.0	43	43	43	42	42	42	41	41	41	40	
70.5	44	43	43	43	43	42	42	42	41	41	
71.0	44	44	44	43	43	43	42	42	41	41	
71.5	45	44	44	44	43	43	42	42	42	41	
72.0	45	45	45	44	44	44	43	43	42	42	
72.5	46	45	45	45	44	44	44	44	43	43	
73.0	46	46	46	45	45	45	44	44	44	43	
73.5	47	46	46	46	45	45	45	44	44	44	
74.0	47	47	47	46	46	46	45	45	45	44	
74.5	48	47	47	47	46	46	46	45	45	45	
75.0	48	48	47	47	47	47	47	46	46	45	
75.5	49	48	48	48	48	47	47	46	46	46	

		HEIGHT (INCHES)								
CIRCUMF.	VALUE *	73.0	73.5	74.0	74.5	75.0	75.5	76.0	76.5	77.0
34.5	0	0	0	0	0	0	0	0	0	0
35.0	0	0	0	0	0	0	0	0	0	0
35.5	0	0	0	0	0	0	0	0	0	0
36.0	0	0	0	0	0	0	0	0	0	0
36.5	0	0	0	0	0	0	0	0	0	0
37.0	0	0	0	0	0	0	0	0	0	0
37.5	0	0	0	0	0	0	0	0	0	0
38.0	0	0	0	0	0	0	0	0	0	0
38.5	0	0	0	0	0	0	0	0	0	0
39.0	0	0	0	0	0	0	0	0	0	0
39.5	0	0	0	0	0	0	0	0	0	0
40.0	1	1	0	1	1	0	0	0	0	0
40.5	2	2	1	2	2	1	1	1	1	1
41.0	3	2	2	3	2	2	2	2	2	1
41.5	4	3	3	4	3	3	3	3	2	2
42.0	4	4	4	4	4	4	3	3	3	3
42.5	5	5	5	5	5	5	5	4	4	5
43.0	6	6	5	6	6	6	5	5	6	5
43.5	7	7	6	7	6	6	5	6	6	5
44.0	8	7	7	7	6	6	6	6	6	6
44.5	8	8	8	8	7	7	7	7	7	7
45.0	9	9	9	8	8	8	7	7	8	8
45.5	10	10	9	9	9	9	9	8	9	8
46.0	11	10	10	10	10	9	9	9	9	9
46.5	12	11	11	11	10	10	10	10	10	10
47.0	12	12	12	11	11	11	11	11	11	11
47.5	13	13	12	12	12	12	12	12	12	11
48.0	14	13	13	13	13	12	13	12	12	12
48.5	14	14	14	14	13	13	14	13	13	13
49.0	15	15	15	14	14	14	14	14	14	14
49.5	16	16	15	15	15	15	15	15	15	14
50.0	17	16	16	16	16	16	16	16	15	15
50.5	17	17	17	16	17	17	17	16	16	16
51.0	18	18	17	17	17	17	17	17	17	16
51.5	19	18	18	18	18	18	18	18	17	17
52.0	19	19	19	18	18	18	19	18	18	18
52.5	20	20	19	19	19	19	19	19	19	19
53.0	21	20	20	20	20	19	19	19	19	19
53.5	21	21	21	20	20	20	20	20	19	19
54.0	22	22	21	21	21	21	21	21	21	20
54.5	23	22	22	22	21	21	21	21	21	21
55.0	23	23	23	22	22	22	22	22	21	21
55.5	24	24	23	23	23	22	22	22	22	22
56.0	25	24	24	24	23	23	23	23	22	22
56.5	25	25	25	24	24	24	24	23	23	23
57.0	26	25	25	25	25	25	24	24	24	23
57.5	26	26	26	26	25	25	25	25	24	24
58.0	27	27	26	26	26	26	26	25	25	25
58.5	28	27	27	27	27	26	26	26	26	25

CIRCUMF. VALUE *	60.0	60.5	61.0	61.5	62.0	62.5	63.0	63.5	64.0
11.0	3	2	2	2	2	1	1	1	1
11.5	4	4	4	3	3	3	2	2	2
12.0	6	5	5	5	5	4	4	4	4
12.5	7	7	6	6	6	6	5	5	5
13.0	8	8	8	8	7	7	7	7	6
13.5	10	9	9	9	9	8	8	8	8
14.0	11	11	10	10	10	10	10	9	9
14.5	12	12	12	11	11	11	11	11	10
15.0	13	13	13	13	12	12	12	12	12
15.5	15	14	14	14	14	13	13	13	13
16.0	16	15	15	15	15	15	14	14	14
16.5	17	17	16	16	16	16	15	15	15
17.0	18	18	17	17	17	17	16	16	16
17.5	19	19	19	18	18	18	18	17	17
18.0	20	20	20	19	19	19	19	18	18
18.5	21	21	21	20	20	20	20	19	19
19.0	22	22	22	21	21	21	21	20	20
19.5	23	23	23	22	22	22	22	21	21
20.0	24	24	23	23	23	23	22	22	22
20.5	25	25	24	24	24	24	23	23	23
21.0	26	26	25	25	25	25	24	24	24
21.5	27	26	26	26	26	25	25	25	25
22.0	28	27	27	27	27	26	26	26	26
22.5	28	28	28	28	27	27	27	27	27
23.0	29	29	29	29	28	28	28	28	28
23.5	30	30	30	29	29	29	29	29	29
24.0	31	31	30	30	30	30	30	30	30
24.5	32	31	31	31	31	31	31	31	30
25.0	33	32	32	32	31	32	32	31	31
25.5	33	33	33	33	32	33	32	32	32
26.0	34	34	34	33	33	33	33	33	33
26.5	35	35	34	34	34	33	34	34	33
27.0	36	35	35	35	34	34	35	34	34
27.5	36	36	36	35	35	35	35	35	35
28.0	37	37	36	36	36	36	36	36	36
28.5	38	37	37	37	37	37	37	37	36
29.0	38	38	38	38	37	37	37	37	37
29.5	39	39	39	38	38	38	38	38	38
30.0	40	39	39	39	39	38	38	39	38
30.5	40	40	40	40	40	39	39	39	39
31.0	41	41	40	40	41	40	40	40	40
31.5	42	42	41	41	41	41	41	40	40
32.0	42	42	42	42	42	42	41	41	41
32.5	43	43	42	42	42	42	42	42	41
33.0	44	43	43	43	42	42	42	42	42
33.5	44	44	44	43	43	43	43	42	42
34.0	45	45	44	44	44	43	43	43	43
34.5	45	45	45	45	45	44	44	44	43
35.0	46	46	45	45	45	45	44	44	44

## PERCENT BODY FAT FOR MALES

CIRCUMF. VALUE	HEIGHT (INCHES)										
	65.0	65.5	66.0	66.5	67.0	67.5	68.0	68.5	69.0	69.5	
11.0	0	0	0	0	0	0	0	0	0	0	
11.5	2	2	1	1	1	1	0	0	0	0	
12.0	3	3	3	3	2	2	2	2	0	0	
12.5	4	4	4	4	4	4	3	3	2	1	
13.0	6	6	6	5	5	5	5	4	3	3	
13.5	7	7	7	7	6	6	6	5	4	4	
14.0	9	8	8	8	8	8	7	6	5	5	
14.5	10	10	9	9	9	9	8	7	7	7	
15.0	11	11	11	10	10	10	10	9	8	8	
15.5	12	12	12	12	11	11	11	11	9	9	
16.0	13	13	13	13	12	12	12	12	11	10	
16.5	14	14	14	14	14	13	13	13	12	11	
17.0	16	15	15	15	15	14	14	14	13	13	
17.5	17	16	16	16	16	16	15	15	14	14	
18.0	18	17	17	17	17	17	16	16	15	15	
18.5	19	18	18	18	18	18	17	17	16	16	
19.0	20	19	19	19	19	19	18	18	16	16	
19.5	21	20	20	20	20	19	19	19	19	19	
20.0	22	21	21	21	21	21	20	20	20	20	
20.5	22	22	22	22	22	21	21	21	21	20	
21.0	23	23	23	23	22	22	21	21	21	20	
21.5	24	24	24	24	22	22	22	22	22	21	
22.0	25	25	25	24	22	23	23	23	22	22	
22.5	26	26	25	25	24	24	24	24	23	23	
23.0	27	27	26	26	26	25	25	24	24	24	
23.5	28	27	27	27	27	26	25	25	25	25	
24.0	28	28	28	28	27	27	27	26	26	26	
24.5	29	29	29	29	28	28	28	27	27	26	
25.0	30	30	30	29	29	29	29	28	27	27	
25.5	31	31	30	30	30	30	29	29	28	28	
26.0	32	31	31	31	31	30	30	30	29	29	
26.5	32	32	32	32	31	31	31	30	30	29	
27.0	33	33	32	32	32	32	32	31	30	30	
27.5	34	33	33	33	33	33	32	31	31	31	
28.0	34	34	34	34	33	33	32	32	32	32	
28.5	35	35	35	34	34	33	33	33	33	32	
29.0	36	36	35	34	34	34	34	33	33	33	
29.5	36	36	35	35	35	35	34	34	34	34	
30.0	37	37	37	36	35	35	35	35	35	34	
30.5	38	38	37	37	36	36	36	35	35	35	
31.0	38	38	38	38	37	37	36	36	36	36	
31.5	39	39	39	38	38	38	38	37	37	36	
32.0	40	39	39	39	39	38	38	37	37	37	
32.5	40	40	40	40	39	39	39	38	38	38	
33.0	41	41	40	40	40	40	40	39	38	38	
33.5	42	41	41	41	41	41	40	40	39	39	
34.0	42	42	42	41	41	41	41	40	40	39	
34.5	43	42	42	42	42	42	42	41	40	40	
35.0	43	43	43	43	43	42	42	42	41	41	

CIRCUMF. VALUE *	HEIGHT (INCHES)										
	70.0	70.5	71.0	71.5	72.0	72.5	73.0	73.5	74.0	74.5	
11.0	0	0	0	0	0	0	0	0	0	0	
11.5	0	0	0	0	0	0	0	0	0	0	
12.0	1	1	1	1	0	0	0	0	0	0	
12.5	3	2	2	2	2	2	1	1	0	0	
13.0	4	4	4	3	3	3	3	2	1	1	
13.5	5	5	5	5	4	4	4	4	2	2	
14.0	7	6	6	6	6	6	5	5	5	4	
14.5	8	8	7	7	7	7	7	6	6	6	
15.0	9	9	9	8	8	8	8	8	7	7	
15.5	10	10	10	9	9	9	9	9	9	8	
16.0	11	11	11	11	10	10	10	10	10	9	
16.5	12	12	12	12	12	11	11	11	11	11	
17.0	13	13	13	13	13	12	12	12	12	12	
17.5	14	14	14	14	14	13	13	13	13	12	
18.0	15	15	15	15	15	14	14	14	14	13	
18.5	16	16	16	16	16	15	15	15	15	14	
19.0	17	17	17	17	17	16	16	16	16	15	
19.5	18	18	18	18	18	17	17	17	17	16	
20.0	19	19	19	19	18	18	18	18	17	17	
20.5	20	20	20	20	19	19	19	19	19	18	
21.0	21	21	21	20	20	20	20	20	19	18	
21.5	22	22	22	21	21	21	21	21	20	19	
22.0	23	23	22	22	22	22	22	22	21	20	
22.5	24	23	23	23	23	23	23	22	22	21	
23.0	25	24	24	24	24	24	23	23	23	22	
23.5	25	25	25	25	24	24	24	24	24	23	
24.0	26	26	26	25	25	25	25	25	24	24	
24.5	27	27	26	26	26	26	26	26	25	25	
25.0	28	27	27	27	27	27	27	26	26	25	
25.5	28	28	28	28	28	28	28	27	26	26	
26.0	29	29	29	29	28	28	27	27	27	27	
26.5	30	30	29	29	29	28	28	28	27	27	
27.0	31	30	30	30	30	29	29	29	28	28	
27.5	31	31	31	31	30	30	29	29	29	29	
28.0	32	32	32	31	31	30	30	30	30	29	
28.5	33	33	32	32	32	32	31	31	30	30	
29.0	34	34	34	34	33	33	32	32	31	31	
29.5	34	34	34	34	33	33	32	32	32	31	
30.0	35	35	34	34	34	34	34	33	33	32	
30.5	35	35	35	35	35	35	34	34	34	33	
31.0	36	36	36	35	35	35	35	35	34	33	
31.5	37	36	36	36	36	36	36	35	34	34	
32.0	37	37	37	37	37	36	36	36	35	35	
32.5	38	38	37	37	37	36	36	36	36	35	
33.0	39	38	38	38	38	38	37	37	36	36	
33.5	39	39	39	38	39	38	37	37	37	37	
34.0	40	39	39	39	38	38	38	38	37	37	
34.5	40	40	40	40	40	39	39	38	38	38	
35.0	41	41	40	40	40	40	40	39	39	39	

PERCENT BODY FAT FOR MALES

HEIGHT (INCHES)

75.0	75.5	76.0	76.5	77.0	77.5	78.0	78.5	79.0	79.5
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0
2	2	2	1	1	1	1	1	1	0
3	3	3	3	3	2	2	2	2	2
5	4	4	4	4	4	3	3	3	3
6	6	5	5	5	5	5	4	4	4
7	7	7	6	6	6	6	6	6	5
8	8	8	8	7	7	7	7	6	5
9	9	9	9	8	8	8	8	7	6
10	10	10	10	10	9	9	9	8	8
11	11	11	11	11	10	10	10	9	9
12	12	12	12	12	11	11	11	10	10
13	13	13	13	13	12	12	12	11	11
14	14	14	14	14	13	13	13	12	12
15	15	15	15	15	14	14	13	13	13
16	16	16	16	16	15	14	14	14	14
17	17	17	17	16	16	15	15	15	15
18	18	18	18	17	17	17	17	16	16
19	19	19	18	18	18	18	17	17	16
20	20	20	19	19	19	19	18	18	17
21	21	20	20	20	20	20	19	19	18
22	21	21	21	21	21	20	20	19	19
22	22	22	22	22	21	21	21	20	20
23	23	23	23	22	22	22	22	21	21
24	24	24	23	23	23	23	23	22	21
25	25	24	24	24	24	24	23	23	22
26	25	25	25	25	25	24	24	24	23
26	26	26	26	26	25	25	25	25	24
27	27	27	26	26	26	26	26	25	25
28	28	27	27	27	27	27	26	26	25
28	28	28	28	28	27	27	27	26	26
29	29	29	29	28	28	28	28	27	27
30	30	29	29	29	29	29	28	28	27
31	30	30	30	30	30	29	29	28	28
31	31	31	31	30	30	30	30	29	29
32	32	31	31	31	31	31	31	30	29
33	32	32	32	32	32	32	31	30	30
33	33	33	33	32	32	32	31	31	31
34	34	33	33	32	32	32	32	32	31
34	34	34	33	33	33	33	32	32	32
35	35	35	34	34	33	33	33	33	33
36	35	35	35	34	34	34	34	33	33
36	36	36	36	35	35	35	34	34	34
37	37	36	36	36	35	35	35	35	34
37	37	37	37	37	36	36	35	35	35
38	38	38	37	37	36	36	36	36	36
38	38	38	38	38	37	37	37	36	36
39	38	38	38	38	38	38	37	37	37

**APPENDIX C**  
**BODY FAT MEASUREMENTS FOR MEN**

## BODY FAT MEASUREMENT TECHNIQUE - MEN

A3-1. General Instructions. To measure an individual's body fat percentage you will need to know the individual's height, without shoes to nearest half inch, and have a standard, nonstretching (metal, cloth/fiberglass) tape-measure. When applied to the body, the tension of the tape should be sufficient to keep it in place without indenting the skin surface. All measurements will be taken on bare skin.

A3-2. Procedures.

a. With the individual looking straight ahead and shoulders down (not hunched), measure the neck circumference at a point just below the larynx (Adam's apple) and perpendicular to the long axis of the neck (spinal column). Neck measurements will be rounded up to the half inch (i.e., round 16 1/8 inches to 16 1/2 or 16 5/8 to 17 inches). (figure A3-1)

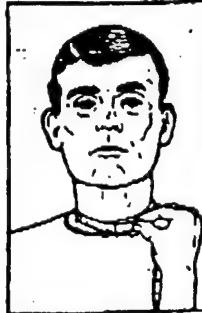


Figure A3-1. Neck Measurement.

b. With the individual standing with arms at his sides and at the end of a normal relaxed exhalation, measure the abdominal circumference at the navel while keeping the tape level to the floor. Abdominal measurements will be rounded down to the half inch (i.e., round 34 3/4 inches to 34 1/2 or 34 1/4 to 34 inches). (figure A3-2)



Figure A3-2. Abdominal Measurement.

c. The individual's body fat percentage is determined by first subtracting the neck measurement from the abdominal measurement (ensure the rounded measurements are used, if appropriate). Next, utilizing the attached men's chart, compare this value to the individual's height measurement.

**APPENDIX D**  
**BODY FAT MASS FORMULA FOR MEN**

c. The individual's body fat percentage is determined by ~~first~~  
subtracting the neck measurement from the abdominal measurement  
(ensure the rounded measurements are used, if appropriate). Next,  
utilizing the attached men's chart, compare this value to the  
individual's height measurement.

**APPENDIX E**  
**BODY FAT MEASUREMENT FOR WOMEN**

## BODY FAT MEASUREMENT TECHNIQUE - WOMEN

A2-1. General Instructions. To measure an individual's body fat percentage you will need to know the individual's height, without shoes to nearest half inch, and have a standard, nonstretching (metal, cloth/fiberglass) tape measure. When applied to the body, the tension of the tape should be sufficient to keep it in place without indenting the skin surface. With the exception of women's hip measurements, all measurements will be taken on bare skin. Women's hip measurements will be taken while the woman is wearing gym-type shorts.

A2-2. Procedures.

a. With the individual looking straight ahead and shoulders down (not hunched), measure the neck circumference at a point just below the larynx (Adam's apple) and perpendicular to the long axis of the neck (spinal column). Neck measurements will be rounded up to the half inch (i.e., round 13 1/8 inches to 13 1/2 or 13 5/8 to 14 inches). (figure A2-1)



Figure A2-1. Neck Measurement.

b. With the individual standing with arms at her sides and at the end of a normal relaxed exhalation, measure the natural waist circumference. The natural waist circumference is the narrowest point usually located about half-way between the navel and the lower end of the sternum (breast bone). When it is not easy to distinguish the narrowest point, take several measurements and use the smallest. Waist measurements will be rounded down to the half inch (i.e., round 25 3/4 inches to 25 1/2 or 25 1/4 to 25 inches). (figure A2-2)



Figure A2-2. Waist Measurement.

c. While facing the individual's right side, and with the tape level to the floor, measure the hip circumference by placing tape around the hips so that it passes over the gluteal muscles (buttocks) at the point that protrudes the farthest. Make sure the tape is applied with sufficient tension so the effect of clothing is limited. Hip measurements will be rounded down to half inch (i.e., round 36 3/4 inches to 36 1/2 or 36 1/4 to 36 inches). (figure A2-3)

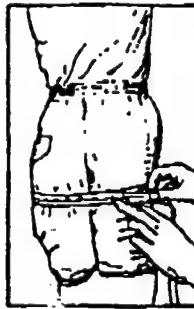


Figure A2-3. Hip Measurement.

d. The individual's body fat percentage is determined by adding the waist and hip measurements then subtracting the neck measurement from the sum. Next, utilizing the attached women's chart, compare this value with the individual's height measurement.

**APPENDIX F**  
**BODY FAT MASS FORMULA FOR WOMEN**

d. The individual's body fat percentage is determined by adding the waist and hip measurements then subtracting the neck measurement from the sum. Next, utilizing the attached women's chart, compare this value with the individual's height measurement.

APPENDIX G  
MAXIMUM ALLOWABLE WEIGHT CHART

UNITED STATES AIR FORCE  
MAXIMUM ALLOWABLE WEIGHT (MAW) TABLE



MEN							WOMEN						
HEIGHT (INCHES)	MAW	INTERPOLATED WEIGHT			DESIRED WEIGHT	HEIGHT (INCHES)	MAW	INTERPOLATED WEIGHT			DESIRED WEIGHT		
		1/4"	1/2"	3/4"				1/4"	1/2"	3/4"			
60	153	153 1/4	154	154 1/4	138	60	136	136 1/4	137	137 1/4	122		
61	155	155 1/4	156	156 1/4	140	61	138	138 1/4	139	139 1/4	124		
62	158	158 1/4	159	159 1/4	142	62	141	141 1/4	141	141 1/4	127		
63	160	161	162	163	144	63	142	143	144	145	128		
64	164	165 1/4	166	167 1/4	148	64	146	147	148	149	131		
65	169	170 1/4	171	172 1/4	152	65	150	151 1/4	152	153 1/4	135		
66	174	175 1/4	176	177 1/4	157	66	155	156	157	158	139		
67	179	180 1/4	181	182 1/4	161	67	159	160 1/4	161	162 1/4	143		
68	184	185 1/4	186	187 1/4	166	68	164	165	166	167	148		
69	189	190 1/4	191	192 1/4	170	69	168	169 1/4	170	171 1/4	151		
70	194	195 1/4	196	197 1/4	175	70	173	174	175	176	156		
71	199	200 1/4	202	203 1/4	179	71	177	178 1/4	179	180 1/4	159		
72	205	206 1/4	208	209 1/4	185	72	182	183 1/4	185	186 1/4	164		
73	211	212 1/4	214	216 1/4	190	73	188	189 1/4	191	192 1/4	169		
74	218	219 1/4	221	222 1/4	196	74	194	195 1/4	196	197 1/4	175		
75	224	225 1/4	227	228 1/4	202	75	199	200 1/4	202	203 1/4	179		
76	230	231 1/4	233	234 1/4	207	76	205	206 1/4	207	208 1/4	184		
77	236	237 1/4	239	240 1/4	212	77	210	211 1/4	212	213 1/4	189		
78	242	243 1/4	245	246 1/4	218	78	215	216 1/4	218	219 1/4	193		
79	248	249 1/4	251	252 1/4	223	79	221	222 1/4	223	224 1/4	199		
80	254	255 1/4	257	258 1/4	229	80	226	227 1/4	229	230 1/4	203		

NOTES: 1. For every inch under 60 inches, subtract 2 pounds from the MAW. For every inch over 80 inches, add 6 pounds to the MAW.

2. Measure without shoes.

3. Subtract 3 pounds for clothing.

AFVA 40-503 (prescribed by AFM 40-502)

**APPENDIX H**  
**HUMAN SUBJECTS APPROVAL LETTER**

Human Subjects Committee

THE UNIVERSITY OF  
**ARIZONA.**  
 HEALTH SCIENCES CENTER

1622 E. Mabel St.  
 Tucson, Arizona 85724  
 (520) 626-6721

18 December 1996

Melanie A. Prince, B.S., R.N.  
 c/o Kathleen M. May, Ph.D.  
 College of Nursing  
 PO BOX 210103

RE: HSC A96.61 NURSE CASE MANAGEMENT OF OVERWEIGHT CLIENTS

Dear Ms. Prince:

We received your 17 December 1996 letter and accompanying revised consent form for the above referenced project. Protocol changes for this re-designed two-group study include addition of female subjects with lower age limit revised to 18 years vs. 17, deletion of audiotape recordings and belt accessory for recorder, and elimination of home/worksit visits [consent form amended accordingly]. Approval for these changes is granted effective 18 December 1996.

The Human Subjects Committee (Institutional Review Board) of the University of Arizona has a current assurance of compliance, number M-1233, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no further changes or additions will be made either to the procedures followed or to the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Human Subjects Committee and your College or Departmental Review Committee. Any research related physical or psychological harm to any subject must also be reported to each committee.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

*William F Denny*

William F Denny, M.D.  
 Chairman  
 Human Subjects Committee

WFD:rs

cc: Departmental/College Review Committee

**APPENDIX I**

**DISCLAIMER**

## DISCLAIMER

Nurse Case Management of Clients in the  
Air Force Weight Management Program

This research study will examine the impact of nurse case management of people in the Air Force Weight Management Program. You are being asked to volunteer to participate in one of two groups. One group will have a nurse case manager assisting them in the weight management program. The other group will not have a case manager assisting them in the weight management program. Both groups will be interviewed and measured at the beginning and end of the program. Also, both groups will be asked to establish goals for losing weight in accordance with the Air Force guidelines in the Weight Management Program. If you volunteer to participate, you have an equal chance of being selected for either group. You may withdraw from the study at any time. Participating in this study does not exempt you from any Air Force administrative actions if you fail to progress as per AFI 40-502 Weight Management Program Instructions. Participating in the study does not guarantee weight loss. All information will be kept confidential. Forms will not include your name. There are no known risks to participating in the study. If you have any questions, please feel free to ask me and I will attempt to answer.

Melanie A. Prince, Capt, USAF, NC  
Graduate Student  
University of Arizona  
Telephone: 579-9871

APPENDIX J

DAVIS-MONTHAN AIR FORCE BASE APPROVAL LETTER



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 36TH WING (ACC)  
DAVIS-MONTHAN AIR FORCE BASE, ARIZONA

13 May 1996

MEMORANDUM FOR TRI-SERVICE NURSING RESEARCH GROUP

FROM: 355 WG/CC  
5275 E. Granite Street  
Davis-Monthan AFB AZ 85707-3012

SUBJECT: Pilot Research Study

1. I have reviewed the abstract for Nurse Case Management of Overweight Patients and grant permission for Captain Melanie A. Prince to conduct her study at Davis-Monthan Air Force Base.
2. Captain Prince has permission to use base facilities, where available, to conduct classes and interviews. I expect complete cooperation with this study to the fullest extent possible from commanders or other supervisory personnel whom she will be contacting. Subjects will be selected randomly from individuals who are in the weight management program and who have volunteered for the research study. Captain Prince has permission to examine personnel records and medical records of the volunteers. Prior to Captain Prince obtaining access to personnel and medical records, subjects should be informed that if they consent to the release of their records, they in effect waive their Privacy Act rights. Examination of the records will be useful in determining weight loss patterns prior to nurse case management. At all times, she will exercise extreme caution to protect the privacy of all members involved in the study.
3. Captain Melanie Prince will not release any information for publication without prior coordination with base public affairs. At any time during the study, information will be provided to me upon request.

*Barry W. Barksdale*  
BARRY W. BARKSDALE, Colonel, USAF  
Commander

*Global Power for America*

**APPENDIX K**  
**INTERVIEW FORM**

## INTERVIEW (Initial And Final)

ID # \_\_\_\_\_

Date \_\_\_\_\_

Initial:

Weight: \_\_\_\_\_ lbs

MAW: \_\_\_\_\_ lbs

BFM: \_\_\_\_\_ %

MABFW: \_\_\_\_\_ %

Monthly goal \_\_\_\_\_

Final:

Weight: \_\_\_\_\_ lbs

MAW: \_\_\_\_\_ lbs

BFM: \_\_\_\_\_ %

MABFW: \_\_\_\_\_ %

Monthly goal : 1st \_\_\_\_\_

Achieved? Yes No

2<sup>nd</sup> \_\_\_\_\_

Achieved? Yes No

**APPENDIX L**  
**CLIENT INTERVENTION LOG**

## CLIENT INTERVENTION LOG

Client ID # \_\_\_\_\_ Date: \_\_\_\_\_

## ASSESSMENT

DEMOGRAPHICS		Age:	Duty Title:	Work Phone:
Marital Status:		Job Description:	Home Phone:	Other:
Children:		Rank:	Duty Hours:	
Gender:		Ethnicity:	Years in WMP:	
NUTRITION				
Typical Daily Intake	Weekday			
Breakfast Time:		Lunch Time:	Dinner Time:	Snack Time:
Foods:		Foods:	Foods:	Foods:
Weekend:				
Breakfast Time:		Lunch Time:	Dinner Time:	Snack Time:
Foods:		Foods:	Foods:	Foods:
Knowledge Base:				
Cal/Fat Cts:	Yes	No	Label Reads:	Yes No
EXERCISE	Activity		Food Prep:	Yes No
			Activity	Diet Programs: Yes No
				Activity
LIFESTYLE		Perceived Stress:	Home Barriers:	Consult Needed?
Time:				

<b>PLANNING</b>	Problem: _____	
	<b>GOAL</b>	
	Weekly:	Monthly:
	Activity:	Pounds
		Fat %
<b>IMPLEMENTING</b>	Other:	Other:
	Transaction:	Time
		Time
<b>MONITOR</b>	Coordinate: _____	
	Communicate: _____	
		Time
<b>EVALUATE</b>	Client Behaviors: _____	
	New or Changed	
		Time
<b>EVALUATE</b>	Evaluate Client: _____	
	Weight _____	Time _____
	BFM _____	Time _____

**APPENDIX M**  
**GOAL ATTAINMENT CHECKLIST**

## GOAL ATTAINMENT CHECKLIST

CLIENT ID #	WEEKLY GOALS (N = Nutrition, E = Exercise, O = Other)		GOAL MET	GOAL NOT MET
	Week 1	Week 2		
Week 3				
Week 4				
Week 5				
Week 6				
Week 7				
Week 8				
Month 1 Goal	BFM % _____		Pounds _____	
Month 2 Goal	BFM % _____		Pounds _____	
Final Meas.	BFM% _____		Pounds _____	

Note: Goals must be met 100% to be measured as a "goal met"

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